HYDROLOGIC STUDY OF THE
SYCAMORE CREEK SUB-BASIN

JULY 28, 2000

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CHAPTER 1
Executive Summary

Introduction

Maderas Golf Club (Maderas) is located in the northern portion of the City of Poway in San Diego County. Maderas property occupies 205 acres. The property is bounded to the north and east by a new planned community; to the south by Espola Road; to the east by Old Coach Estates, Old Coach Road and Malone avocado ranch; and to the west by Stoneridge Estates and lower Sycamore Creek homeowners.

Maderas is an 18-hole golf club covering 180 acres of the property; approximately 120 acres are irrigated. Manmade lakes store irrigation water. The lakes are lined with a geotechnical membrane. Five irrigation wells have been drilled on the north side of Sycamore Creek that runs along the southern boundary of the site. Sycamore Creek supports habitats typical of southwestern riparian systems. The broad flood plain of the creek allows for the development of an oak and willow woodland. An observation well has been drilled on the east side of the property near the entrance to Maderas. In April 2000, four riparian observation wells were drilled.

The City of Poway has requested that Maderas perform hydrogeologic and biologic studies to determine 1) the quantity of groundwater available for pumping from the underlying groundwater basin, and 2) if pumping of the wells at Maderas may cause depletion in the quantity of groundwater available for pumping at the site and at off-site wells and to the riparian habitat. The studies are to conform to the requirements of the County of San Diego Groundwater Ordinance No. 7994 (Ordinance). Chapter 2 is the hydrogeologic study, Chapter 3 is the biologic study, and Chapter 4 is the operational plan for groundwater production from the basin.

Conclusions

The following are our conclusions from our study of the hydrogeology and biology of the Sycamore Creek Sub-basin.
1. Production of approximately 145 gallons per minute for 5 days at Well 4 (1,033,158 gallons or 3.17 acre-feet) produced a decline in the static water levels in the wells to the west of the golf club (lower Sycamore Creek) but had no effect on the static water levels in the wells to the east (Old Coach Estates).

2. Calculated transmissivities range from 3,800 to 8,500 gallons per day per foot.

3. Calculated storativities based on analyses using the Gringarten and Witherspoon and the Cooper-Jacob methods range between 0.000354 to 0.000855. The Moench method estimated storativity at 0.0001 to 0.000137.

4. Water demand under existing cultural conditions (residence and Maderas Golf Club) for the Sycamore Creek Sub-basin is estimated to be 503 acre-feet per year.

5. At build-out of residential lots (and including Maderas Golf Club), the water demand is estimated to be 579 acre-feet per year.

6. Average groundwater recharge is estimated to be 442 acre-feet per year.

7. The total aquifer storage within the Sycamore Creek Sub-basin is estimated to range between 543 acre-feet and 866 acre-feet.

8. The groundwater balance, shown on the following page, indicates that the long-term average quantity of groundwater available for pumping by Maderas is 323 acre-feet.

9. Maderas' groundwater production has been metered since August 1999. The total groundwater production for August 1999 through May 2000 is 217.68 acre-feet.

10. Groundwater level measurements taken on July 9, 2000 indicate a decline at off-site wells of 35.7 feet at the Lower Sycamore Creek Test Well and 5.3 feet at Old Coach Estates Test Well below the baseline measurements taken on March 25, 2000.

11. There is no apparent effect on the riparian vegetation resulting from the operation of groundwater wells at Maderas.

12. Willows have a shallower root system than sycamore or oak trees and therefore would be the first tree species to show evidence of poor health or drought stress in response to groundwater use.

13. In time, and with the collection of additional data, it will be possible to ascertain if there is deterioration of the health of the willows onsite.
**Groundwater Balance**

Pumping = 376 Acre-feet

- Residents—53 Acre-feet
- Maderas Golf Club—323 Acre-feet

**Recharge**
- Effective Precipitation—289 Acre-feet
- Streambed—100 Acre-feet

**Change in Storage Equals Zero**

**Applied Water**
- Maderas Golf Club—450 Acre-feet
  - Groundwater—323 AF
  - Potable—124 AF
  - Residential—53 Acre-feet

**Consumptive Use**
- Turf at Maderas Golf Club—414 Acre-feet
- Residential—49 Acre-feet
- Riparian—50 Acre-feet

**GROUNDWATER BALANCE EQUATION**

\[
\text{Inflow} = \text{Outflow} - \text{Change In Storage} \\
\text{Recharge} + \text{Applied Water} = \text{Pumping} + \text{Consumptive Use} - \text{Change in Storage}
\]
Recommendations

California water law is based on the concept of riparian rights, and first in time first in right. This concept means that homeowners adjacent to the creek or overlying a groundwater basin have prior rights to the production and use of water from the Sycamore Creek Sub-basin. However, it also establishes that Maderas Golf Club has the right to use the groundwater until the neighbors are affected by their water production. We recommend the following course of action to allow for the use of groundwater from the Sycamore Creek Sub-basin by Maderas Golf Club and the neighbors to the east and west.

1. Set a preliminary and temporary operating limit for production from the Sycamore Creek Sub-basin of 309 acre-feet; 256 acre-feet is to be allotted to Maderas and 53 acre-feet is to be allotted to the homeowners.

2. Implement an operational plan to allow Maderas and the neighbors to fully utilize the groundwater resource. The operational plan in Chapter 4 sets forth safeguards to limit production during dry years and protect the users with prior rights to the groundwater and to protect the riparian vegetation.

3. Monitor groundwater levels at Maderas wells and off-site wells, and at riparian transect locations.
CHAPTER 2
Hydrogeologic Study

Introduction

The Maderas Golf Club is located in the northern portion of the City of Poway in San Diego County and is in the Sycamore Creek watershed. Plate 1 is a vicinity map. The area of the watershed is approximately 2,804 acres. The boundaries of the watershed are shown on Plate 2, in Appendix A. Drainage in the Sycamore Creek watershed is from the highlands into Thompson Creek and into Sycamore Creek. Thompson Creek is intermittent, flowing only during wet periods. Sycamore Creek is classified as a perennial stream. The streamflow of Sycamore Creek is maintained during dry periods by springs, irrigation runoff and seepage from upstream reservoirs. Sycamore Creek flows into the San Dieguito River and ultimately to the ocean.

Water Sources and Uses

The following is an inventory of the water sources within the boundaries of the Sycamore Creek watershed. Also indicated in this list are the sources of the data.

- Precipitation gaged at Poway Valley Station No. 7111, located at the Poway Fire Station No. 2, 16914 Westling Court, Poway, California, elevation 648 feet (National Oceanic and Atmospheric Administration). Figure 1 depicts the annual precipitation and average precipitation.

The following is an inventory of the water uses within the boundaries of the Sycamore Creek watershed. Also indicated in this list is the source of the data.

- Groundwater production wells (County of San Diego Environmental Health Services and homeowners), copies of the available well logs are included in Appendix B.
- Riparian habitat along Sycamore Creek.
- One spring at the tailwaters of Thompson Creek located in township 13 South, range 1 West, section 19 (USGS Escondido, California Quad photorevised 1975).

Geology

Maderas Golf Club is located in a steep-sided canyon surrounded by higher relief peaks to the east. Elevations across the golf club range from 460 feet long the southern boundary to 690 feet at the northern boundary. The site is located near the western...
ANNUAL PRECIPITATION (Poway Valley Station No. 7111)

Data for WY 2000 are October 1999 through April 2000.

Figure 1
margin of the Southern California Batholith. Cretaceous tonalitic, granodioritic and gabbroic plutonic rocks comprise the bedrock. Bedrock is mantled by thin colluvial and alluvial deposits along the floor of the main canyon and the margins. Plate 2, in Appendix A, is a map showing the geology of the watershed.

Woodward-Clyde Consultants prepared a report dated May 3, 1990 entitled “Water Supply Evaluation, Old Coach Golf Estates, Poway, California.” This report states that within the main canyon the alluvium is at least 25 feet thick and the sediments are composed of interbedded silty sand and sandy gravels. Four borings performed under the direction of Don Howard Engineers, Inc. confirm the thickness of the alluvium at 25 feet along Sycamore Creek. Away from Sycamore Creek, and juxtaposed to the alluvium, is colluvium. The colluvium is composed of sand, gravel, occasional boulders and finer grained materials derived from the bedrock upslope. The colluvium is up to 10 feet in thickness. At depth below the alluvium the aquifer is composed of decomposed or highly weathered granitic bedrock. The decomposed bedrock ranges from a few feet in thickness to approximately 40 feet based on previous borings and those performed by Don Howard Engineers. The degree of weathering decreases with depth. Appendix C contains copies of the geologists logs for the four borings performed by Don Howard Engineers.

Groundwater at Maderas is present within the alluvium and underlying decomposed bedrock, and is found at depth in the joints and fractures of the tonalite bedrock (fractured rock aquifer). The California Department of Health Services (DHS) defines a fractured rock aquifer as “hav(ing) open space along faults and fractures which have formed long after the rock was formed (“secondary permeability and porosity”). Because fractures develop in response to geologic stresses, they are often grouped in specific directions, creating permeability and ground water flow paths which are anisotropic (not uniform in all directions).” Aerial photographs reveal a faint northwest joint trend in the poorly exposed tonalite near the Maderas wells. Sycamore Creek trends northwest, north and west along joint sets that partly control the original course.
Aerial photographs were reviewed to identify linear features that reflect the underlying structural geology, principally fracture or joint trends. Lineaments shown on the aerial photograph are presented on Plate 3, in Appendix D. The photographs were taken in 1984 and reveal site conditions prior to the golf club grading. Linear features, including drainage courses, follow a northwest and east-west trend within the tonalite bedrock aquifer tapped by the Maderas wells along Sycamore Creek. North of Sycamore Creek, a north-south trend occurs along the westerly boundary of the site. These linear trends are fracture or joint trends that also control the course of the drainage channels. Although the tonalite is generally poorly exposed, similar linear trends are evident south of Sycamore Creek. Surface reconnaissance indicates that the joints are inclined near vertical.

East of Maderas Golf Club a strong northeast joint trend is evident in the Woodson Mountain Granodiorite. Thompson Creek trends northeast punctuated with short north-south and northwest segments. The joints exposed along Thompson Creek, east of Maderas, are vertical.

The occurrence of steep to vertically inclined fractures is apparent in the borehole logs available for Maderas and off-site wells. The driller’s logs indicate only two to three fractures are intercepted in wells ranging from 125 to 1,000 feet deep. The prevalence of steeply inclined fractures is supported by the occurrence of only a few fractures being intersected by each vertical well. Plate 4, in Appendix E shows a cross-section through Sycamore Creek and Thompson Creek. Tables 1 through 3 are summaries of the well data from the driller’s log. Table 4 is a summary of well drilled on the far eastern side of the watershed in Ramona. No wells, for which data are available, in the Ramona area are producing wells. The location of the cross-section and the wells depicted on the cross-section are shown on Plate 3.
### Table 1
Well Data For Maderas Golf Club Wells

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<th>Well Number</th>
<th>Flow Meter Number</th>
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<th>Pump Setting (ft bgs)</th>
<th>Driller</th>
<th>Annular Seal (ft)</th>
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<th>Well Depth (ft bgs)</th>
<th>Fracture Zone (ft bgs)</th>
<th>Estimated Water Duration (hours)</th>
<th>Estimated Yield (gpm)</th>
<th>Drawdown (ft bgs)</th>
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All wells are located on parcel 2771700600.
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SWL = Static water level.
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Unk. = Information unknown.
SWL = Static water level.
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<th>Borehole Size</th>
<th>Cased Below Annular Seal (ft)</th>
<th>Annular Seal (in)</th>
<th>Well Depth (ft bgs)</th>
<th>Fracture Zone</th>
<th>Estimated Water (gpm)</th>
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<th>Duration (hour)</th>
<th>Estimated Yield (gpm)</th>
<th>Drawdown (ft bgs)</th>
<th>Comments</th>
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Unk. = Information unknown.
SWL = Static water level.
Soils

Soils in the vicinity of the Maderas Golf Club fall under the Fallbrook-Vista Association, Rocky and the Cieneba-Fallbrook Association, Very Rocky, as mapped by the Soil Conservation Service (1973). Predominant soil types in the area are sandy loams of the Fallbrook (Fa) Series, coarse and rocky coarse sandy loams of the Vista (Vs) Series, and coarse and rocky sandy loams of the Cieneba (Cn) Series. Small areas of Visalia (Va), Tujunga (Tu), and Ramona (Ra) Series soils are found along the stream drainages traversing the area. The soil types in the lower Sycamore Creek Sub-basin are shown on Plate 5, in Appendix F. Table 5, next page, shows the soil moisture capacities for the soils in the Sycamore Creek Watershed.

The Fallbrook (Fa) sandy loams are characterized as well-drained moderately deep soil formed in material predominantly weathered in place from granitic rock. In the project area, Fallbrook Series soils are located primarily within the central and eastern side of the Maderas Golf Club property and on the western most side of the watershed.

The Vista (Vs) Series mapped in the watershed are characterized as well-drained moderately deep soil formed on upland slopes and derived predominantly from granitic rock. Vista Series soils are located primarily in the northern and western regions of the Maderas Golf Club site and along Thompson Creek in the Old Coach Estates.

Cieneba (Cn) Series soils are shallow to very shallow, excessively drained, rocky to coarse sandy loams that have formed in material weathered from the underlying granitic rock. Cieneba soils are located on the moderate to steep upland slopes around the entire periphery of the project area.

Soils of the Visalia (Va), Tugunga (Tu), and Ramona (Ra) Series are found on the stream terraces and flood plains along the stream drainages in the watershed of the lower Sycamore Creek Sub-basin. These soils are formed from granitic alluvium and range from deep to very deep, moderately to excessively drained, sand to gravelly sandy loams.
Table 5  
SOIL MOISTURE CAPACITIES FOR SOILS  
IN THE SYCAMORE CREEK WATERSHED

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<tr>
<th>Soil Type</th>
<th>Soil Moisture Capacity</th>
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<td>Cienega (Cn)</td>
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<td>Cienega—Fallbrook Soils (Cm/Cn)</td>
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<tr>
<td>Fallbrook Soils (Fa)</td>
<td>3 to 5 inches</td>
</tr>
<tr>
<td>Vista Soil (Vs)</td>
<td>2 to 4.5 inches</td>
</tr>
<tr>
<td>Visalia-Ramona Soil (Va/Ra)</td>
<td>8 to 9.5 inches</td>
</tr>
<tr>
<td>Tujunga Soil (Tu)</td>
<td>3 to 4 inches</td>
</tr>
</tbody>
</table>

Step-Drawdown Test

A step-drawdown pumping test was conducted on March 17, 2000 at Well 4 to determine specific capacity at various pumping rates and establish a sustainable flow rate for the long-term aquifer test. The water level had fully recovered at Well 4 following a period of about 4 months of no pumping. A three-point step drawdown test was performed at approximate discharge rates of 95, 130, and 160 gpm. The results of this test are depicted on Figure 2. Pumping was maintained at each discharge rate or “step” for three hours to allow water levels to partially stabilize. Electric sounders and electronic data loggers with pressure transducers were used to monitored pumping levels.
Figure 2

STEP DRAWDOWN TEST RESULTS

<table>
<thead>
<tr>
<th>STEP NO.</th>
<th>DISCHARGE RATE (gpm)</th>
<th>DRAWDOWN (feet)</th>
<th>SPECIFIC CAPACITY (gpm/ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>95.4</td>
<td>139.74</td>
<td>0.73</td>
</tr>
<tr>
<td>2</td>
<td>132.1</td>
<td>228.46</td>
<td>0.58</td>
</tr>
<tr>
<td>3</td>
<td>158.7</td>
<td>329.31</td>
<td>0.49</td>
</tr>
</tbody>
</table>

WELL 1, Max Drawdown = -0.16 feet
WELL 2, Max Drawdown = 0.72 feet
WELL 3, Max Drawdown = 3.94 feet
WELL 5, Max Drawdown = 0.31 feet
The pumping rates, final water levels, drawdown, and resultant specific capacities for the step test are presented in Table 6. The pre-test static water level at Well 4 was approximately 94 feet bgs. From the data that were gathered during the nine hours of pumping for the step-drawdown test, we recommended a long-term pumping rate of 145 gallons per minute during the aquifer test.

Table 6
STEP DRAWDOWN TEST RESULTS

<table>
<thead>
<tr>
<th>Average Pumping Rate, Q (gpm)</th>
<th>Pumping Level Depth, (ft)</th>
<th>Drawdown, s (ft)</th>
<th>Specific Capacity Q/s, (gpm/ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>95.4</td>
<td>227.28</td>
<td>130.74</td>
<td>0.73</td>
</tr>
<tr>
<td>132.1</td>
<td>325.02</td>
<td>228.48</td>
<td>0.58</td>
</tr>
<tr>
<td>158.7</td>
<td>417.45</td>
<td>320.91</td>
<td>0.49</td>
</tr>
</tbody>
</table>

Constant Rate Pumping Test and Aquifer Testing Analysis

A five-day constant rate test was conducted at Well 4 from March 26 through March 31, 2000 (119 hours). This test was designed to determine aquifer characteristics and drawdown under longer-term pumping conditions. At the end of the test, the final pumping water level was at 387 feet bgs (drawdown of 288 feet). This level of drawdown is expected for wells pumping from a fractured rock aquifer. The average pumping rate was 144.7 gpm, resulting in a specific capacity of approximately 0.5 gpm/ft of drawdown.

During the pumping test a network of observation wells provided an opportunity to measure pumping influences at wells within the golf club and upstream and downstream. Residential well owners cooperated by not pumping their wells before, during and after the 5-day test. Water levels were measured at the pumping well, 5 other on site golf club wells, 3 wells in the Old Coach Estates east of Maderas Golf Club and 4 wells to the west along lower Sycamore Creek. Water levels were measured with electric sounders and electronic dataloggers. Dataloggers were installed in on site wells and in
inactive wells located in the off site residential areas. Results of the water level monitoring are summarized in Table 7.

**Table 7**

**WATER LEVEL MONITORING SUMMARY.**

<table>
<thead>
<tr>
<th>Well Identification</th>
<th>Distance From Pumping Well (feet)</th>
<th>Length of Water Level Record Before Start of Test</th>
<th>After End of Test</th>
<th>Maximum Drawdown Measured (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maderas Golf Club</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well 1</td>
<td>1500</td>
<td>4 days</td>
<td>6 days</td>
<td>0.14</td>
</tr>
<tr>
<td>Well 2</td>
<td>1160</td>
<td>3 days</td>
<td>6 days</td>
<td>6.92</td>
</tr>
<tr>
<td>Well 3</td>
<td>750</td>
<td>3 days</td>
<td>6 days</td>
<td>14.36</td>
</tr>
<tr>
<td>Well 4</td>
<td>0</td>
<td>7 days</td>
<td>6 days</td>
<td>288.29</td>
</tr>
<tr>
<td>Well 5</td>
<td>450</td>
<td>0 days</td>
<td>6 days</td>
<td>1.09</td>
</tr>
<tr>
<td>Well 6</td>
<td>2200</td>
<td>4 days</td>
<td>6 days</td>
<td>-0.03</td>
</tr>
<tr>
<td><strong>Old Coach Estates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Myers Well</td>
<td>3600</td>
<td>4 days</td>
<td>1 day</td>
<td>-2.0</td>
</tr>
<tr>
<td>Tremble Well</td>
<td>3800</td>
<td>0 days</td>
<td>1 day</td>
<td>-1.7</td>
</tr>
<tr>
<td>Old Coach Test Well</td>
<td>3800</td>
<td>4 days</td>
<td>8 days</td>
<td>-1.7</td>
</tr>
<tr>
<td><strong>Lower Sycamore Creek Wells</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tamayo Well</td>
<td>4600</td>
<td>2 days</td>
<td>2 days</td>
<td>2.0</td>
</tr>
<tr>
<td>Barkin Well</td>
<td>4800</td>
<td>2 days</td>
<td>1 day</td>
<td>7.1</td>
</tr>
<tr>
<td>San Dieguito River Park Well</td>
<td>5000</td>
<td>4 days</td>
<td>2 days</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>Lower Sycamore Test Well</strong></td>
<td>4800</td>
<td>2 days</td>
<td>8 days</td>
<td>8.7</td>
</tr>
</tbody>
</table>

Note: Negative drawdown indicates water level rise during the pump test.

Water level responses before, during and after the 5-day test are depicted on Figures 3, 4 and 5. There was minor well pumping in the Old Coach Estates and lower
Old Coach Estates Water Level Response
Maderas Well 4 Pump Test

Maderas Golf Club

Figure 4
Sycamore Creek before, during or immediately after the test. Except for the 9-hour step drawdown test at Well 4, Maderas Golf Club wells had not been pumped for 4 months prior to the start of the test. Review of Figures 3 and 4 reveal that water level response occurred at the two nearest upgradient wells (Wells 2 and 3) and all four downgradient wells (lower Sycamore Creek wells). There was minor water level recovery throughout the aquifer test in the Old Coach Estates wells, as shown in Figure 5. The minor water level recovery was probably due to the reduced pumping in the Old Coach Estates.

The drawdown measurements recorded during the constant rate test can be used to calculate the transmissivity (T) and storage coefficient (S) of the aquifer. Transmissivity and storativity calculations were performed using three analytical methods: 1) Gringarten and Witherspoon (1972) curve-fitting method for observation wells, 2) the distance-time-drawdown method of Cooper and Jacob, and 3) Moench (1984) double-porosity model for slab-shaped blocks of fractured aquifer. Table 8 summarizes the results of these studies.

The Gringarten and Witherspoon (1972) curve-fitting method for observation wells determine T and S from the following equations. Two different approaches were used: 1) the observation wells are located within the fractures tapped by the pumping well, and 2) the observation wells are located in fractures oriented perpendicular to the production fracture.

\[
s = \frac{Q}{4\pi T} F(u_v, r')
\]

Where:

\[
u_v = \frac{Tt}{S x_f^2}
\]

\[
r' = \sqrt{x_f^2 + y^2}
\]

S = storage coefficient
T = transmissivity of the aquifer
<table>
<thead>
<tr>
<th>Methodology</th>
<th>Curve</th>
<th>Well</th>
<th>$r^\prime$</th>
<th>Transmissivity (ft²/min)</th>
<th>Storage Coefficient (gpd/ft)</th>
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</thead>
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<tr>
<td>Gringarten-Witherspoon</td>
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<tr>
<td>Analysis 1</td>
<td>X-Axis</td>
<td>2</td>
<td>5</td>
<td>0.770</td>
<td>8291</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>5</td>
<td>0.770</td>
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<td>0.462</td>
<td>4974</td>
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<td></td>
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<td>0.446</td>
<td>4809</td>
</tr>
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<td>X-Axis</td>
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<td>0.855</td>
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<td>0.810</td>
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<td>3</td>
<td>0.497</td>
<td>5349</td>
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<td></td>
<td>Y-Axis</td>
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<td>0.789</td>
<td>8503</td>
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<td></td>
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<td>5</td>
<td>0.855</td>
<td>9212</td>
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<td>0.497</td>
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<td></td>
<td>3</td>
<td>2</td>
<td>0.489</td>
<td>5264</td>
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<td>Cooper-Jacobs</td>
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<td>0.748</td>
<td>8057</td>
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<tr>
<td>Moench</td>
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<td></td>
<td>3</td>
<td></td>
<td>0.386</td>
<td>4150</td>
</tr>
</tbody>
</table>
\[ x_f = \text{half length of the vertical fracture} \]
\[ x, y = \text{distance between observation well and pumped well, measured along the x and y axis, respectively} \]
\[ s = \text{drawdown in the observation wells} \]

The calculated \( T \) ranged from 0.35 to 0.85 \( \text{ft}^2/\text{min} \) (3,800 to 9,200 gpd/ft) and the calculated storativity ranged from \( 2.86 \times 10^{-4} \) to \( 5.86 \times 10^{-4} \). Appendix G contains the drawdown curves for this analysis.

The distance-time-drawdown method of Cooper and Jacob determines \( T \) and \( S \) from the following equations. Data analysis will be performed by the Cooper-Jacob method using the computer program Aquifer Test by Waterloo Hydrologic. The Modified Nonequilibrium Equation is a simplified version of the Theis Equation. In the use of the Modified Nonequilibrium Equation, it is assumed that the pumping time is sufficiently long or the distance from the pumping well to where the drawdown is measured is sufficiently small. The Modified Nonequilibrium Equation is as follows.

\[
 s = \frac{264 \ Q}{T} \log \frac{0.3 \ T t}{r^2 S}
\]

Where: 
\( s = \text{pumping level drawdown, in feet.} \)
\( Q = \text{pumping rate, in gallons per minute} \)
\( T = \text{coefficient of transmissivity of the aquifer, in gallons per day per foot} \)
\( r = \text{distance, in feet, from the center of a pumped well to a point where the drawdown is measured.} \)
\( S = \text{coefficient of storage (dimensionless)} \)
\( t = \text{time since pumping started, in days} \)

Transmissivity and storage coefficients were calculated from the time-drawdown and distance-drawdown curves. A time-drawdown curve is a plot on semilogarithmic paper of drawdown on the y-axis (arithmetic scale) and time on the x-axis (logarithmic scale). A distance-drawdown curve is a plot on semilogarithmic paper of drawdown on the y-axis and distance on the x-axis. This yields a straight-line plot of both sets of data.
Transmissivity is calculated from the time-drawdown and the distance-drawdown graphs using the following relationship developed from the Modified Nonequilibrium Equation.

\[
T = \frac{264 \, Q}{\Delta s}
\]

Where: \( T \) = coefficient of transmissivity, in gallons per day per foot  
\( Q \) = pumping rate, in gallons per minute  
\( \Delta s \) = slope of the time-drawdown graph expressed as the change in drawdown between any one log cycle

The coefficient of storage is also readily calculated from the time-drawdown and the distance-drawdown graphs using the following relationship developed from the Modified Nonequilibrium Equation.

\[
S = \frac{0.3 \, T l_o}{r^2}
\]

Where: \( S \) = storage coefficient  
\( T \) = coefficient of transmissivity, in gallons per day per foot  
\( t_o \) = intercept of the straight line at zero drawdown, in days  
\( r \) = distance, in feet, from the pumped well to the observation well where the drawdown measurements were made

The calculated \( T \) ranged from 0.61 to 0.78 \( \text{ft}^2/\text{min} \) (6,500 to 8,000 gpd/ft) and the calculated storativity ranged from \( 2.87 \times 10^{-4} \) to \( 3.13 \times 10^{-4} \). Appendix H contains the drawdown curves for this analysis.

The Moench method determines \( T \) and \( S \) from the following equations.

\[
t_s = \frac{K t}{S \, r_n^2}
\]
where:

\[ h = \text{hydraulic head in fracture} \]
\[ h_i = \text{initial hydraulic head} \]
\[ h_d = \text{dimensionless head} \]
\[ T = \text{transmissivity (ft}^2\text{/min)} \]
\[ t_d = \text{dimensionless time} \]
\[ K = \text{hydraulic conductivity of fracture system} \]
\[ S_s = \text{specific storage coefficient of fracture system} \]
\[ r_w = \text{effective radius of pumped well} \]

The calculated transmissivity \( T \) varies from 0.38 to 0.77 ft\(^2\)/min (4,150 to 8,300 gpd/ft), and storativity ranges from \( 1 \times 10^{-4} \) to \( 1.37 \times 10^{-4} \). The figures in Appendix 1 illustrate the results for the drawdown data from observation wells 2 and 3.

The Gringarten-Witherspoon method and the Cooper-Jacob method yielded similar storage coefficients of approximately \( 3 \times 10^{-4} \). The Moench method yielded storage coefficients of approximately \( 1.4 \times 10^{-4} \). A storage coefficient of \( 3 \times 10^{-4} \) is representative of the capacity of the aquifer to store water.

**Existing Water Sources**

Within the watershed of the Lower Sycamore Creek Sub-basin, groundwater supplies the homes in Old Coach Estates, Lower Sycamore Creek and Ramona. Residential wells range in depth from 100 to 1,200 feet.

Recent residential development in the planned community around the Maderas Golf Club has brought City of Poway water lines to the area. Homeowners of the Old Coach Estates have completed construction of an extension of this new pipeline that will connect them to the City supplies. No such plans are currently proposed for the lower Sycamore Creek residential area.
Tertiary reclaimed water is produced at the City of San Diego Aquaculture Wastewater Treatment Plant located about one-mile north of Maderas Golf Club. The City of Poway currently does not retail reclaimed water. Maderas Golf Club has initiated plans to connect to a raw water source at the San Diego County Water Authority aqueduct. Nearby high-demand water consumers include Stoneridge Golf Course and the Malone avocado ranch, which fully or partially utilize alternate sources of water.

**Land Use, Water Demand and Existing Well Capacity**

The City of Poway “Land Use and Zoning Plan” indicates that the properties surrounding Maderas Golf Club are PC—Planned Community and RR-A—Rural Residential. RR-A is defined at 1 dwelling unit per 4, 8, 20 or 40 net acres. The minimum lot size is determined by the average slope and the availability of City water service. Table 9 is a tabulation of the lots by assessor’s parcel number within the watershed of the lower Sycamore Creek Sub-basin. Also presented on this table, if available, are data on owner, lot size, number of wells and use of the land.

Water demands vary based on the type of usage. The following is a list of estimated water demands by usage type.

- Golf course use is based on data from Maderas Golf Club for August 1999 through May 2000, June and July are estimated. Table 10 shows the monthly data.

- Residential use is estimated at 0.75 acre-feet per dwelling per year, although careful irrigation of low-water-demand landscaping can reduce actual demand to 0.5 acre-feet per year.

- Citrus is estimated at 2.5 acre-feet per acre per year.

- Irrigated pasture is estimated at 3.5 acre-feet per acre per year.

The estimated water demand of existing users in the Sycamore Creek Sub-basin is as follows.

- Maderas Golf Club—450 acre-feet per year
## Table 9
### PROPERTIES IN THE SYCAMORE CREEK WATERSHED

<table>
<thead>
<tr>
<th>APN</th>
<th>Address</th>
<th>Owner</th>
<th>Acres</th>
<th>Number of Wells</th>
<th>Well Log Available</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>272150660</td>
<td>No site address</td>
<td>Unknown</td>
<td>35.00</td>
<td>2</td>
<td>No Residence</td>
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<tr>
<td>2721501100</td>
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<td>3.87</td>
<td></td>
<td>No Residence</td>
<td></td>
</tr>
<tr>
<td>2721501200</td>
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<td>Unknown</td>
<td>11.87</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2721502000</td>
<td>18353 Sycamore Creek Rd</td>
<td>DeBoels, Steve and Kathleen</td>
<td>3.12</td>
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<td>Yes Residence</td>
<td></td>
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<tr>
<td>2721502300</td>
<td>18355 Sycamore Creek Rd</td>
<td>Bankin, David and Edie</td>
<td>2.07</td>
<td>2</td>
<td>Yes Residence</td>
<td>County Park and Office</td>
</tr>
<tr>
<td>2721502400</td>
<td>18372 Sycamore Creek Rd</td>
<td>San Dieguito River Park</td>
<td>6.73</td>
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<tr>
<td>2721502600</td>
<td>18374 Sycamore Creek Rd</td>
<td>Tamayo, Ildon</td>
<td>2.80</td>
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<tr>
<td>2721502800</td>
<td>17852 Sycamore Creek Rd</td>
<td>Blum</td>
<td>5.40</td>
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<td></td>
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<td>27.99</td>
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# Properties in the Sycamore Creek Watershed

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<td>Vapion, Frank</td>
<td>2.52</td>
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</tr>
<tr>
<td>2771310100</td>
<td>18047 Old Coach Rd., Poway</td>
<td>Gill</td>
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<td>Kennedy, William C &amp; Ruth L.</td>
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Table 9
PROPERTIES IN THE SYCAMORE CREEK WATERSHED

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<tr>
<th>APN</th>
<th>Address</th>
<th>Owner</th>
<th>Acres of Wells</th>
<th>Well Log</th>
<th>Comments</th>
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Plus an additional 229 lots to the south and west of the golf course that are in established neighborhoods with municipal water supply.
Table 10
MONTHLY WATER PRODUCTION (in acre-feet)

<table>
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<tr>
<th>Date</th>
<th>Water</th>
<th>Groundwater</th>
<th>Total</th>
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<tr>
<td>Aug-99</td>
<td>0</td>
<td>58.89</td>
<td>58.89</td>
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<tr>
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<td>11.53</td>
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<tr>
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<td>Dec-99</td>
<td>10.1</td>
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<td>5.67</td>
<td>0</td>
<td>5.67</td>
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<tr>
<td>Feb-00</td>
<td>7.63</td>
<td>0</td>
<td>7.63</td>
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<tr>
<td>Mar-00</td>
<td>17.21</td>
<td>3.49</td>
<td>20.7</td>
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<tr>
<td>Apr-00</td>
<td>11.07</td>
<td>25.69</td>
<td>36.76</td>
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<tr>
<td>May-00</td>
<td>11.64</td>
<td>42.98</td>
<td>54.62</td>
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<td>Subtotal</td>
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<td>217.68</td>
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<table>
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<tr>
<th></th>
<th>E</th>
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<tr>
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<td>19.43</td>
<td>58.89</td>
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<tr>
<td>Jul-00</td>
<td>39.46</td>
<td>19.43</td>
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<tr>
<td>Total</td>
<td>194.39</td>
<td>256.55</td>
<td>450.94</td>
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</table>

E = Estimated
Hydrogeologic And Biologic Study of the "Sycamore Creek Sub-Basin"

- Lower Sycamore Creek residential—5 residences at 3.75 acre-feet per year
- San Dieguito River Park—0.5 acre-feet per year (fire flow and indoor usage)
- Irrigated pasture (Debolt and Barkin)—7.0 acre-feet per year
- Old Coach Estates residential—37 residences at 27.75 acre-feet per year
- Other residential—12 residences at 9.00 acre-feet per year
- Citrus (Tremble, Myers and Vaplon)—5 acre-feet per year

The estimated total existing water demand for the Sycamore Creek Sub-basin is 503 acre-feet per year; 450 acre-feet is the estimated water requirement for landscape irrigation at Maderas Golf Club and 53 acre-feet is the estimated water requirement for residential uses.

The estimated water demand at build-out in the Sycamore Creek Sub-basin is as follows.

- Maderas Golf Club—450 acre-feet per year
- Lower Sycamore Creek residential—13 residences at 9.75 acre-feet per year
- San Dieguito River Park—1.0 acre-feet per year (fire flow and indoor usage)
- Irrigated pasture (Debolt and Barkin)—7.0 acre-feet per year
- Old Coach Estates residential—129 residences at 96.75 acre-feet per year
- Other residential—12 residences at 9.00 acre-feet per year
- Citrus (Tremble, Myers and Vaplon)—5 acre-feet per year

The estimated total water demand at build-out for the Sycamore Creek Sub-basin is 579 acre-feet per year; 450 acre-feet is the estimated water requirement for landscape irrigation at Maderas Golf Club and 129 acre-feet is the estimated water requirement for residential uses.

**Groundwater Recharge and Storage**

Groundwater recharge and storage are calculated for a local drainage area that underlies Maderas Golf Club and the lower Sycamore Creek homes, and extends east along Thompson Creek into Old Coach Estates. The drainage area boundaries used for
these analyses are presented in Plate 2. The recharge/storage area measures 2,804 acres, which includes the 205-acre Maderas Golf Club.

The computer program RECHARG2 (Huntley, 1990) was used to evaluate the soil moisture budget and thus provide an estimate of the quantity of water available for recharge of the groundwater basin. RECHARG2 calculates the soil moisture budget by the Thorthwaite Method. The program calculates potential groundwater recharge and runoff based on soil type, rainfall, evaporation, and irrigation with groundwater and potable water on Maderas Golf Club.

To estimate the quantity of runoff out of the Sycamore Creek Watershed we used historic streamflow data from the Guejito Creek gaging station. Neither Sycamore Creek nor Thompson Creek have streamflow gaging stations. The Woodward-Clyde study used records from the Guejito Creek gaging station (USGS #11027000). Topographic relief, elevations, soil types, geology and degree of urbanization for both watersheds are similar. The Guejito Creek gaging station is located near San Pasqual. The period of record for this station is 1948 through 1982. The drainage area is 22.5 miles$^2$ and the average annual discharge is 2,090 acre-feet per year. The Sycamore Creek Watershed is approximately 19 percent of the Guejito Creek watershed. We therefore estimate the average annual discharge from the Sycamore Creek Watershed to be 397 acre-feet per year.

Input parameters for our analysis include the following.

- 31-year rainfall record (1969 to 1999) from the Poway Valley Station No. 7111 located about one-mile south of Maderas Golf Club at elevation 648 feet. Table 11 is a tabulation of the annual precipitation data from water year 1968-69 to 1998-99. Figure 6 shows the accumulated deviation from normal and indicates two wet and dry cycles during the period of record.
- Monthly evaportranspiration data are available from the Escondido Station No. 74 located about 6 miles north of the project site at elevation 450 feet. The normal
<table>
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<td>1970</td>
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<td>459.00</td>
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Sum:        | 459.00   | 459.00   | 459.00   | 0.00      |

Average:   | 14.81    |
ACCUMULATED DEVIATION FROM NORMAL (Poway Valley Station No. 7111)
year evapotranspiration at Escondido is 52.6 inches. Table 12 shows the monthly normal evapotranspiration at this station. The other station in the area, Ramona Station No. 98, shows a similar normal year evapotranspiration of 53.4 inches. The Ramona station is located at elevation 1,340 feet.

- Soil moisture capacities for site soils are estimated according to studies by the U.S. Soil Conservation Service (1973). The values used in this study are shown in Table 13.

- Actual irrigation rates for the golf club are available for the months of August, 1999 through May, 2000 and estimated for the months of June and July. Water usage is shown in Table 14.

Recharge for the study area was calculated for six sub-areas by soil type. Table 15 is an overview of the results calculated by RECHARG2. Tables 16 through 23 show the results of the recharge study by soil type. RECHARG2 calculates average runoff from the upland soils of 516 acre-feet per year. As previously, stated streamflow out (outflow) of the watershed has been estimated to be 397 acre-feet. We have thus increased the quantity of recharge to Sycamore Creek Sub-basin by 119 acre-feet per year. The average annual recharge for the drainage area is estimated to be 442 acre-feet, as shown on Table 24. Table 24 shows the calculated recharge by soil type, the quantity of runoff from the upland soils to Thompson and Sycamore Creeks available for recharge along the streambeds, and the calculated streamflow out of the Sycamore Creek Sub-basin watershed.

Groundwater storage capacity is a measure of the quantity of water that can be stored in an aquifer. In the case of a bedrock aquifer, storage capacity represents the degree of fracturing in the basin and quantity of water that is stored in those fractures. Groundwater storage for the Sycamore Creek watershed can be estimated by applying the storage coefficient calculated previously and from published data. The results of the 5-day aquifer test indicate that the storage coefficient for the tested fracture set is 0.0003. The fracture set is estimated to underlie approximately 32% of the area of the Sycamore
Table 12
NORMAL EVAPOTRANSPIRATION AT THE ESCONDIDO STATION

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<thead>
<tr>
<th>Month</th>
<th>ET₀ in inches</th>
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</thead>
<tbody>
<tr>
<td>October</td>
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<tr>
<td>November</td>
<td>2.5</td>
</tr>
<tr>
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<td>May</td>
<td>5.6</td>
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<tr>
<td>June</td>
<td>6.7</td>
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<tr>
<td>July</td>
<td>6.8</td>
</tr>
<tr>
<td>August</td>
<td>6.5</td>
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<tr>
<td>September</td>
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<tr>
<td>Total</td>
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Table 13
SOIL MOISTURE CAPACITIES

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<th>Soil Type</th>
<th>Soil Moisture Capacity</th>
<th>Area in Acres</th>
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</thead>
<tbody>
<tr>
<td>Cienneba (Cn)</td>
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</tr>
<tr>
<td>Cienneba—Fallbrook Soils (Cn/Cn)</td>
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<td>1,572</td>
</tr>
<tr>
<td>Fallbrook Soils (Fa)</td>
<td>4.50</td>
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</tr>
<tr>
<td>Vista Soil (Vs)</td>
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</tr>
<tr>
<td>Visalia-Ramona Soil (Va/Ra)</td>
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<td>75</td>
</tr>
<tr>
<td>Tujunga Soil (Tu)</td>
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</tr>
<tr>
<td>Total</td>
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</tr>
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<td>Irrigation in inches</td>
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</tr>
<tr>
<td>-----------</td>
<td>----------------------</td>
<td></td>
</tr>
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<td>October</td>
<td>6.40</td>
<td></td>
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<td>November</td>
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Table 15

SUMMARY OF RECHARG 2 RESULTS
ASSUMING IRRIGATION AT THE MADERAS GOLF CLUB

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Acreage</th>
<th>Irrigated</th>
<th>Soil Moisture Capacity (Inches)</th>
<th>Assumed Maximum Runoff (%)</th>
<th>Calculated Average Recharge (inches)</th>
<th>Calculated Average Runoff to Streams (inches)</th>
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<tr>
<td>Upland Soils</td>
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Table 16
RECHARGE Results
Fallbrook Soil with Irrigation

Fallbrook Soil, 100 acres

Soil Moisture Capacity = 4.50
Calculated Average Recharge = 4.35
Assumed maximum runoff = 25.00 Percent.
Calculated average runoff = 20.78 Percent.

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<th>Total Rainfall</th>
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<th>Calculated Recharge</th>
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Table 17
RECHARG2 Results
Irrigated Vista Soil

Vista Soil, 20 acres

Soil Moisture Capacity = 3.00 inches
Calculated Average Recharge = 4.90 inches (8 acre-feet per year)
Assumed maximum runoff = 25.00 Percent
Calculated average runoff = 20.38 Percent

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<th>Total Rainfall</th>
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<th>Calculated Recharge</th>
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</table>
### Table 18
#### RECHARG2 Results
#### Non-irrigated Cieneba Soil

**Cieneba Soil, 379 acres**

Soil Moisture Capacity = 1.00
Calculated Average Recharge = 1.47
Assumed maximum runoff = 40.00 Percent.
Calculated average runoff = 11.76 Percent.

<table>
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RECHARG2 Results
Non-irrigated Cieneba-Fallbrook Soil

Cieneba-Fallbrook Soil, 1572 acres

Soil Moisture Capacity = 1.00
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Assumed maximum runoff = 40.00 Percent.
Calculated average runoff = 11.76 Percent.

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Table 20
RECHARG2 Results
Non-irrigated Fallbrook Soil

Fallbrook Soil, 223 acres

Soil Moisture Capacity = 4.50
Calculated Average Recharge = 0.51
Assumed maximum runoff = 40.00 Percent.
Calculated average runoff = 9.15 Percent.

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Table 21
RECHARG2 Results
Non-irrigated Tujunga Soils

Tujunga Soil, 21 acres

Soil Moisture Capacity = 3.00
Calculated Average Recharge = 0.84
Assumed maximum runoff = 40.00 Percent.
Calculated average runoff = 10.09 Percent.

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Table 22
RECHARG2 Results
Non-Irrigated Vista Soil

Vista Soil, 414 acres

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Assumed maximum runoff = 40.00 Percent.
Calculated average runoff = 10.09 Percent.

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<td>4.56</td>
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<tr>
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<td>9.69</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
### Table 24
AVERAGE ANNUAL RECHARGE IN SYCAMORE CREEK
SUB-BASIN ASSUMING IRRIGATION
AT MADERAS GOLF CLUB

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Acreage</th>
<th>Irrigated</th>
<th>Recharge (inches/acre)</th>
<th>Recharge (acre-feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upland Soils</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fallbrook</td>
<td>100</td>
<td>Yes</td>
<td>4.35</td>
<td>36.3</td>
</tr>
<tr>
<td>Vista</td>
<td>20</td>
<td>Yes</td>
<td>4.9</td>
<td>8.2</td>
</tr>
<tr>
<td>Cieneba</td>
<td>379</td>
<td>No</td>
<td>1.47</td>
<td>46.4</td>
</tr>
<tr>
<td>Cieneba-Fallbrook</td>
<td>1572</td>
<td>No</td>
<td>1.47</td>
<td>192.6</td>
</tr>
<tr>
<td>Fallbrook</td>
<td>223</td>
<td>No</td>
<td>0.51</td>
<td>9.5</td>
</tr>
<tr>
<td>Tujunga</td>
<td>21</td>
<td>No</td>
<td>0.84</td>
<td>1.5</td>
</tr>
<tr>
<td>Vista</td>
<td>414</td>
<td>No</td>
<td>0.84</td>
<td>29.0</td>
</tr>
<tr>
<td>Visalia-Ramona</td>
<td>75</td>
<td>No</td>
<td>0.03</td>
<td>0.2</td>
</tr>
<tr>
<td>Sub-total</td>
<td></td>
<td></td>
<td></td>
<td>323.5</td>
</tr>
</tbody>
</table>

Runoff to Sycamore Creek and Thompson Creek: 515.6

Calculated Discharge to San Deiguito River: (397.0)

TOTAL CALCULATED RECHARGE: 442.2
Creek watershed. We estimate that the storage coefficient for this fracture set is representative of fractures in the Sycamore Creek watershed due to the observed water level response within Maderas wells and the lower Sycamore Creek wells during the pumping test. Fracturing, and thus permeability and porosity, occur after the placement of the igneous rocks due to uplift and loss of overburden pressure. To calculate the storage capacity of the alluvium and decomposed granite we have relied on published data and our understanding of the Sycamore Creek Sub-basin. It is estimated that the groundwater storage capacity of the Sycamore Creek Sub-basin is 866 acre-feet. Table 25 shows the calculation of the groundwater storage capacity.

It has been suggested by others that a storage coefficient of 0.0001 was appropriate for those fractures within the watershed that were not directly tested by the 5-day aquifer test. The use of a very conservative storage coefficient is only appropriate when an aquifer test has not been performed at any location in the groundwater basin. However, for comparison purposes, we have calculated the storage capacity using a storage coefficient of 0.0003 for the tested fractures and a storage coefficient of 0.0001 for the remainder of the aquifer. This methodology estimates the total storage capacity to be 543 acre-feet. Table 26 shows the calculation of the storage capacity.

The 5-day aquifer test was performed on a fracture set that underlies approximately one-third of the watershed and fracturing within the watershed probably occurred in response to similar geologic stresses, principally pressure release. In addition, surface exposures of the bedrock underlying the remaining two-thirds of the basin reveal closely spaced fracture sets. Thus, a calculated storage capacity of 866 acre-feet is most representative of the Sycamore Creek Sub-basin.

**Groundwater Balance**

The management of a groundwater basin involves the maintenance of a safe and reliable groundwater supply. The fundamental concept in the management of a groundwater resource is the safe yield. Safe yield is the annual amount of withdrawal
### Table 25

**GROUNDWATER STORAGE CALCULATIONS**

Using Storage Coefficients for Bedrock Aquifer from Aquifer Test Results

<table>
<thead>
<tr>
<th>Formation</th>
<th>Length (feet)</th>
<th>Width (feet)</th>
<th>Area (sq. feet)</th>
<th>Area (acres)</th>
<th>Thickness (feet)</th>
<th>Saturated Thickness (feet)</th>
<th>Storage Coefficient</th>
<th>Storage (acre - feet)</th>
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</thead>
<tbody>
<tr>
<td>Alluvium</td>
<td>10,000</td>
<td>100</td>
<td>1,000,000</td>
<td>23</td>
<td>25</td>
<td>15</td>
<td>0.30</td>
<td>103</td>
</tr>
<tr>
<td>Decomposed Bedrock</td>
<td>10,000</td>
<td>200</td>
<td>2,000,000</td>
<td>46</td>
<td>35</td>
<td>35</td>
<td>0.03</td>
<td>48</td>
</tr>
<tr>
<td>Bedrock Represented by Tested Fracture Set</td>
<td></td>
<td></td>
<td></td>
<td>902</td>
<td>850</td>
<td>850</td>
<td>0.0003</td>
<td>230</td>
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<tr>
<td>Other Bedrock in the Watershed</td>
<td>1901</td>
<td>850</td>
<td>850</td>
<td></td>
<td></td>
<td></td>
<td>0.0003</td>
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<td><strong>Total</strong></td>
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</table>

**Data Sources:**

Specific Yield of Alluvium
- 0.2 Medium to coarse grained sand, unconfined—Johnson, Groundwater and Wells
- 0.1-0.3 Sandy alluvium--U.S. Dept. of Interior, Groundwater Manual
- 0.3-0.32 Fine to medium sand--Morris & Johnson, 1967
- 0.3 Coarse sand--Morris & Johnson, 1967
- 0.19-0.33 Water laid sand--Morris & Johnson, 1967
- 0.24-0.28 Fine to medium gravel--Morris & Johnson, 1967

Specific Yield of Decomposed Granite
- 0.12 Siltstone--Morris & Johnson, 1967
### Table 26
GROUNDWATER STORAGE CALCULATIONS
Using Published Data

<table>
<thead>
<tr>
<th>Formation</th>
<th>Length (feet)</th>
<th>Width (feet)</th>
<th>Area (sq. feet)</th>
<th>Area (acres)</th>
<th>Thickness (feet)</th>
<th>Saturated Thickness (feet)</th>
<th>Storage Coefficient</th>
<th>Storage (acre-feet)</th>
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<tbody>
<tr>
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<td>100</td>
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<td>23</td>
<td>25</td>
<td>15</td>
<td>0.30</td>
<td>103</td>
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<tr>
<td>Decomposed Bedrock</td>
<td>10,000</td>
<td>200</td>
<td>2,000,000</td>
<td>46</td>
<td>35</td>
<td>35</td>
<td>0.05</td>
<td>48</td>
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<tr>
<td>Bedrock Represented by Tested Fracture Set</td>
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<tr>
<td>Other Bedrock in the Watershed</td>
<td>1901</td>
<td>850</td>
<td>850</td>
<td>902</td>
<td>850</td>
<td>850</td>
<td>0.0003</td>
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Data Sources:

**Specific Yield of Alluvium**

- 0.2 Medium to coarse grained sand, unconfined—Johnson, Groundwater and Wells
- 0.1-0.3 Sandy alluvium—U.S. Dept. of Interior, Groundwater Manual
- 0.3-0.32 Fine to medium sand—Morris & Johnson, 1967
- 0.3 Coarse sand—Morris & Johnson, 1967
- 0.19-0.33 Water laid sand—Morris & Johnson, 1967
- 0.24-0.28 Fine to medium gravel—Morris & Johnson, 1967

**Specific Yield of Decomposed Granite**

- 0.12 Silistone—Morris & Johnson, 1967
(pumping) that does not exceed annual recharge, permanently lower the water table to an uneconomic level, or allow intrusion of poor-quality water. The quantity of water available for withdrawal can be calculated from the groundwater balance. Two methodologies were employed for the calculation of the quantity of water available for groundwater production.

The first method used the following equation.

\[ \text{Inflow} = \text{Outflow} + \text{change in storage} \]

The following is a listing of the elements of inflow in the Sycamore Creek Sub-basin.

- \( Q_{ep} \): effective precipitation recharging the groundwater reservoir
- \( Q_{sre} \): recharge of surface runoff in the streambed
- \( Q_{apw} \): applied water from irrigation with potable water
- \( Q_{agw} \): applied water from irrigation with groundwater

In addition, the following is a listing of the elements of outflow.

- \( Q_{op} \): groundwater pumping
- \( Q_{cu} \): consumptive use

In the calculation of the long-term average quantity of groundwater available for withdrawal from the Sycamore Creek Sub-basin the change in groundwater storage is assumed to be zero (0).

The components of the groundwater balance are shown in Figure 7. The inflow items are titled “Recharge” and “Applied Water.” “Recharge” is composed of effective precipitation of 289 acre-feet per year and recharge of surface runoff in the streambed of 100 acre-feet. Effective precipitation was calculated by RECHARG2 using 31 years of monthly rainfall from the Poway Valley Station No. 7111 and normal monthly evapotranspiration from the Escondido Station No. 74, irrigation was not considered in this model. Table 27 shows the recharge from effective precipitation by soil type. Recharge in the streambed of surface runoff was calculated as the difference in the runoff calculated by RECHARG2 (497 acre-feet) and the estimated surface water outflow from the Sycamore Creek Watershed (397 acre-feet). Table 27 also shows the runoff to the
PUMPING: 376 AF
RESIDENTS 53 AF
MADERAS 323 AF

APPLIED WATER: 503 AF
MADERAS 450 AF
GROUNDWATER 323 AF
POTABLE 124 AF
RESIDENTIAL 53 AF

RECHARGE: 389 AF
PRECIPITATION 289 AF
STREAMBED 100 AF

CHANGE IN STORAGE = 0

CONSUMPTIVE USE: 513 AF
APPLIED WATER
MADERAS 414 AF
RESIDENTIAL
PUMPING 49 AF
RIPARIAN 50 AF

NOTE: CONSUMPTIVE USE AT 92% OF APPLIED WATER

"GROUNDWATER BALANCE" FOR SYCAMORE CREEK SUB-BASIN

FIG. 7
<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Acreage</th>
<th>Irrigated</th>
<th>Soil Moisture Capacity (Inches)</th>
<th>Assumed Maximum Runoff (%)</th>
<th>Calculated Average Recharge (inches)</th>
<th>Calculated Average Runoff to Streams (inches)</th>
<th>Calculated Average Recharge (acre-feet)</th>
<th>Calculated Average Runoff to Streams (acre-feet)</th>
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<tr>
<td>Upland Soils</td>
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<td>0.93</td>
<td>1.23</td>
<td>7.8</td>
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<td>1.33</td>
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<td>1.47</td>
<td>2.24</td>
<td>192.6</td>
<td>293.4</td>
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<tr>
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<td>0.84</td>
<td>2.00</td>
<td>1.5</td>
<td>3.5</td>
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<tr>
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<td>0.84</td>
<td>2.00</td>
<td>29.0</td>
<td>69.0</td>
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<tr>
<td>Visalia-Ramona</td>
<td>75</td>
<td>No</td>
<td>8.50</td>
<td>40</td>
<td>0.03</td>
<td>1.56</td>
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<td></td>
<td></td>
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</table>
streambed by soil type. Table 28 shows the recharge in the streambed. "Applied Water" is composed of golf club irrigation by groundwater and potable water.

The outflow items are estimated consumptive use by the turf at the golf club (414 acre-feet) and estimated consumptive use by the residents (49 acre-feet). Eventhough, RECHARG2 accounts for evapotranspiration from the watershed we have allocated an additional 50 acre-feet of consumptive use to the riparian plants. The long-term average quantity of groundwater available for pumping from the Sycamore Creek Sub-basin is calculated to be 376 acre-feet (53 acre-feet for pumping by the residents and 323 acre-feet for pumping by Maderas Golf Club).

An alternate groundwater balance method was calculated for the watershed to determine the long-term availability of groundwater for consumptive use. The "Groundwater Ordinance" limits groundwater production to 50 percent of the basin storage. Figure 8 shows the long-term availability of groundwater in the Sycamore Creek Sub-basin assuming a storage capacity of 866 acre-feet and annual consumptive use of 145 acre-feet. This model calculates on a yearly basis the groundwater recharge from rainfall using the data from RECHARG2.

This analysis predicts that in three years out of thirty-one (1969-1999) the quantity of groundwater in storage would be less than 433 acre-feet (50 percent of the basin's storage capacity). However, in all years groundwater in storage exceeds 400 acre-feet.

Figure 9 shows the long-term availability of groundwater in the Sycamore Creek Sub-basin assuming a storage capacity of 543 acre-feet and annual consumptive use of 110 acre-feet.
<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Acreage</th>
<th>Irrigated</th>
<th>Runoff (inches/acre)</th>
<th>Runoff (acre-feet)</th>
</tr>
</thead>
<tbody>
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<td>100</td>
<td>No</td>
<td>1.23</td>
<td>10.3</td>
</tr>
<tr>
<td>Vista</td>
<td>20</td>
<td>No</td>
<td>1.33</td>
<td>2.2</td>
</tr>
<tr>
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<td>379</td>
<td>No</td>
<td>2.24</td>
<td>70.7</td>
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<tr>
<td>Cieneba-Fallbrook</td>
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<td>2.24</td>
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<td>1.86</td>
<td>34.6</td>
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<tr>
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<td>No</td>
<td>2.00</td>
<td>3.5</td>
</tr>
<tr>
<td>Vista</td>
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<td>2.00</td>
<td>69.0</td>
</tr>
<tr>
<td>Visalia-Ramona</td>
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<td>No</td>
<td>1.56</td>
<td>2.8</td>
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<tr>
<td><strong>Sub-total</strong></td>
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<td><strong>493.5</strong></td>
</tr>
</tbody>
</table>

Calculated Discharge to San Deiguito River (397.0)

**TOTAL STREAMBED RECHARGE**

96.5
**Groundwater Model**

A groundwater flow model was developed to estimate water level impacts to wells surrounding the Maderas Golf Club. The model was developed to evaluate a worst-case scenario of continuous pumping of all five Maderas wells for 9-months (270-days). In this model total groundwater production is 471 acre-feet. The model was based on water levels measured in all the Maderas wells and the off site observation wells measured during the aquifer test. Aquifer parameters of hydraulic conductivity and storage are based on the aquifer test results for the Maderas area and estimated for the eastern part of the site. Aquifer parameters used for the model are presented in Table 29.

<table>
<thead>
<tr>
<th>Model Area</th>
<th>Hydraulic Conductivity</th>
<th>Bedrock Storage Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Area (Maderas)</td>
<td>1.0 ft/day</td>
<td>0.0003</td>
</tr>
<tr>
<td>Eastern Area</td>
<td>0.5 ft/day</td>
<td>0.0002</td>
</tr>
</tbody>
</table>

Long term pumping rates of the Maderas Wells are presented in Table 30 and represent the actual well capacity observed after 10 days of continuous pumping.

<table>
<thead>
<tr>
<th>Well Number</th>
<th>Pumping Rate in gpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>37</td>
</tr>
<tr>
<td>2</td>
<td>130</td>
</tr>
<tr>
<td>3</td>
<td>27.5</td>
</tr>
<tr>
<td>4</td>
<td>137.5</td>
</tr>
<tr>
<td>5</td>
<td>62.5</td>
</tr>
<tr>
<td>Total</td>
<td>394.5</td>
</tr>
</tbody>
</table>

The flow model was developed using the USGS Modflow program (Waterloo Hydrogeologic, Visual Modflow). The single layer model grid consists of 12 columns.
and 7 rows using a 1000-foot spacing to represent the fractured bedrock aquifer. Recharge from the alluvial and weathered bedrock aquifers was ignored. Boundary conditions were defined to provide a conservative input of water into the model. Constant head boundaries are applied to the cells that provide flow into the model area at the east end along Thompson Creek, at the south end along Sycamore Creek, and at the confluence with the San Dieguito River. In addition, the cells along the easternmost column and southernmost rows are designated general head boundaries to represent groundwater inflow from the adjoining upland areas immediately outside the model. Finally, areal recharge of 0.1 foot/year is applied to the model.

The model estimates drawdown in the Old Coach Estates and Lower Sycamore Creek areas following continuous pumping by all five of the Maderas wells. Results of the model run are presented in Figure 10. The model predicts drawdown at the Old Coach Estates Test Well will be approximately 14 feet. The model predicts drawdown in the Lower Sycamore Creek area will be approximately 21 feet. These water level changes are based on conservative assumptions of continuous, sustained pumping of all five wells and limited recharge during an extended period without rainfall. The flow model underestimates the seven day drawdown at the Lower Sycamore Creek observation well (3 feet) measured during the aquifer test (8 feet), although the model does predict zero drawdown influence at the Old Coach Estates observation well as measured during the aquifer test. Consequently, the 270-day model results estimating 15 to 25 feet of off site water table influence are within reasonable limits of accuracy.

Figure 11 is a long-term hydrograph of the Old Coach Estates Test Well and monthly rainfall for 1995 through present. Table 31 is a tabulation of rainfall, depth to water, change in depth to water and water surface elevation. The hydrograph shows that in the past water levels at the Old Coach Estates Test Well (OCETW) have been as low as 217 feet below ground surface (October 1996) and as high as 61 feet below ground surface (June and July 1998).
HYDROGRAPH
Old Coach Test Well
Ground surface = 590 feet

Note: Measurements from October 1995 to October 1999 taken by Old Coach Estates residence, measurements from February 2000 taken by Don Howard Engineers for Maderas Golf Club.

Figure 11
<table>
<thead>
<tr>
<th>Date</th>
<th>Rainfall in inches</th>
<th>Depth to Water in feet</th>
<th>Change in Depth to Water in feet</th>
<th>Water Surface Elevation in feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct-95</td>
<td>0</td>
<td>132.25</td>
<td>132.25</td>
<td>457.75</td>
</tr>
<tr>
<td>Nov</td>
<td>0.34</td>
<td>156.67</td>
<td>24.42</td>
<td>433.33</td>
</tr>
<tr>
<td>Dec</td>
<td>0.61</td>
<td>161.25</td>
<td>4.58</td>
<td>428.75</td>
</tr>
<tr>
<td>Jan-96</td>
<td>1.62</td>
<td>180.08</td>
<td>18.83</td>
<td>409.92</td>
</tr>
<tr>
<td>Feb</td>
<td>3.4</td>
<td>195</td>
<td>14.92</td>
<td>395</td>
</tr>
<tr>
<td>March</td>
<td>2.13</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>April</td>
<td>0.74</td>
<td>162.42</td>
<td>-32.58</td>
<td>427.58</td>
</tr>
<tr>
<td>May</td>
<td>0.67</td>
<td>170</td>
<td>7.58</td>
<td>420</td>
</tr>
<tr>
<td>June</td>
<td>0</td>
<td>193.92</td>
<td>23.92</td>
<td>396.08</td>
</tr>
<tr>
<td>July</td>
<td>0.1</td>
<td>204.25</td>
<td>10.33</td>
<td>385.75</td>
</tr>
<tr>
<td>Aug</td>
<td>0</td>
<td>209.25</td>
<td>5</td>
<td>380.75</td>
</tr>
<tr>
<td>Sept</td>
<td>0.12</td>
<td>214.75</td>
<td>5.5</td>
<td>375.25</td>
</tr>
<tr>
<td>Oct</td>
<td>1.2</td>
<td>217.33</td>
<td>2.58</td>
<td>372.67</td>
</tr>
<tr>
<td>Nov</td>
<td>2.72</td>
<td>214.75</td>
<td>-2.58</td>
<td>375.25</td>
</tr>
<tr>
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<td>200.58</td>
<td>-14.17</td>
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</tr>
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<td>175.75</td>
<td>-34.82</td>
<td>414.25</td>
</tr>
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<td>148.08</td>
<td>-27.67</td>
<td>441.92</td>
</tr>
<tr>
<td>March</td>
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<tr>
<td>April</td>
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<td>146</td>
<td>17</td>
<td>444</td>
</tr>
<tr>
<td>May</td>
<td>0.07</td>
<td>175.42</td>
<td>29.42</td>
<td>414.58</td>
</tr>
<tr>
<td>June</td>
<td>0.04</td>
<td>184.17</td>
<td>8.75</td>
<td>405.83</td>
</tr>
<tr>
<td>July</td>
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<td>401.58</td>
</tr>
<tr>
<td>Aug</td>
<td>0</td>
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</tr>
<tr>
<td>Sept</td>
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<td>7.58</td>
<td>394</td>
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<tr>
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<td>180.83</td>
<td>-15.17</td>
<td>409.17</td>
</tr>
<tr>
<td>Nov</td>
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<td>193.83</td>
<td>13</td>
<td>396.17</td>
</tr>
<tr>
<td>Dec</td>
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<td>165</td>
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<td>145.33</td>
<td>-19.67</td>
<td>444.67</td>
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<tr>
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<td>10.36</td>
<td>131.75</td>
<td>-13.58</td>
<td>458.25</td>
</tr>
<tr>
<td>March</td>
<td>3.68</td>
<td>106</td>
<td>-25.75</td>
<td>484</td>
</tr>
<tr>
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<td>2.35</td>
<td>75</td>
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<td>512</td>
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<tr>
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<td>2.24</td>
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<td>524</td>
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<td>-4.83</td>
<td>528.83</td>
</tr>
<tr>
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<td>0</td>
<td>528.83</td>
</tr>
<tr>
<td>Aug</td>
<td>0</td>
<td>65</td>
<td>3.83</td>
<td>525</td>
</tr>
<tr>
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<td>36</td>
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</tr>
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<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
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<td>69</td>
<td>420</td>
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<td>438.5</td>
</tr>
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<td>443.5</td>
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<td>458</td>
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<td>460.33</td>
</tr>
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<td>-12.92</td>
<td>473.25</td>
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<td>19.17</td>
<td>429</td>
</tr>
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<td>31.5</td>
<td>397.5</td>
</tr>
<tr>
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<td>--</td>
</tr>
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<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Feb</td>
<td>4.89</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
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<td>99.52</td>
<td>-92.98</td>
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</tr>
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<td>1.99</td>
<td>97.01</td>
<td>-2.51</td>
<td>492.99</td>
</tr>
<tr>
<td>May</td>
<td>101.87</td>
<td>4.86</td>
<td>488.13</td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>102.71</td>
<td>0.84</td>
<td>487.29</td>
<td></td>
</tr>
</tbody>
</table>

Ground surface elevation is estimated to be 590 feet.

A positive change indicates a decrease in water levels and a negative change indicates an increase in water levels.
Evaluation Of Project Impacts

Results of the aquifer testing determined the local aquifer parameters, verified sustained pumping rates, and identified impacts to nearby wells. Review of Figure 4 indicates that no short-term drawdown influence occurred in the Old Coach Estates. However, a water level impact was identified for the downgradient groundwater wells of lower Sycamore Creek Sub-basin as shown in Figure 5. Due to the uncertainty of potential impacts to the water table under long-term pumping a water level monitoring plan is recommended. In addition, an operational plan with monitoring is recommended to protect the groundwater resource and provide a sustainable yield for the groundwater users.
CHAPTER 3
Biological Assessment of Riparian Habitat

Introduction

The City of Poway has expressed concern that the operation of the groundwater wells on the recently constructed Maderas Golf Course might affect riparian resources downstream along Sycamore Creek. Typically deep wells do not affect the shallow water resources that support riparian habitat. However, there may be instances in which drawdown may occur. Therefore, REC Consultants Inc. on behalf of Sunroad Enterprises conducted a biological assessment of the riparian habitat immediately upstream and immediately downstream from the golf course. The following report represents a baseline of existing conditions. An annual report will be prepared that summarizes the overall health of the riparian system of Sycamore Creek based on yearlong data analysis.

Methods

REC biologist, Elyssa Robertson, Denise Moe, and Danielle Flynn conducted a comparison between habitat conditions on the Maderas Golf Course, upstream from the golf course, and downstream from the golf course on February 24 and 25, 2000. Data were collected from seven locations: two onsite locations, two upstream locations, and three downstream locations. At each of the seven locations a band transect was established. Each band transect was ten meters in width and traversed the entire width of the creek habitat and included both the Oak and Willows/Sycamore woodland on either side of the creek. All transects, with the exception of one upstream transect, were located on Sycamore Creek. One upstream transect was located on Thompson Creek.

Riparian plants require plentiful and continuous water supplies. If groundwater is artificially lowered, trees may not have the adaptive capacity to grow their roots deep enough to tap ground water, causing a tree to deteriorate in health and eventually die. To evaluate this possibility, each tree within a given transect was identified to species and assessed for general health and overall drought stress.
Given a shallower root system, it was assumed that the herbaceous layer would be immediately affected if an area is experiencing drought stress. The understory cover was assessed utilizing four sample grids within the band transect to determine ground cover (only two grids were used along the upstream Thompson Creek transect due to size of the transect). Each sample grid was ten meters by ten meters in size. Within each grid, the percentage cover by each species was noted. In addition to a difference in overall cover, species composition would be expected to reflect changing hydrological conditions resulting from a lowered ground water. As the moisture content in the soil decreases, the overall percentage of herbaceous and shrub cover, within each sample grid, was estimated.

Ground water analysis was not conducted at this time. The creek was flowing and the ground was moist in all locations. Therefore, soil saturation and groundwater analysis was not required to prove that water was available for the plants.

Results

The habitats of Sycamore Creek are typical of southwestern riparian systems. The board flood plain of the creek allows for the development of an oak woodland along the outer fringe and willow riparian woodland through the middle. The creekbed of Sycamore Creek itself is small and shallow, but does contain daily flows. The creekbed is easily overcome with moderate to heavy rains and the wide, flat floodplain becomes saturated and in some areas inundated. At the time of the data sampling the creek was flowing with three to six inches of water and the ground on either side of the creekbed was wet and/or saturated.

The oak woodlands areas are dominated by coast live oak trees (*Quercus agrifolia*), an evergreen tree. Oak woodland areas can provide a valuable buffer to riparian habitat for fire protection and erosion, besides providing valuable wildlife habitat. Willow trees (a deciduous tree) dominate riparian habitats, scrub species such as mulefat, and scattered cottonwoods and sycamores. Both sycamores and cottonwood are
deciduous. Sycamores are typically associated with the outer fringe of a floodplain, between the oaks and the willows. Whereas willows can endure long duration’s of inundation, sycamores and oaks typically are supported through groundwater and soil saturation at slightly higher elevations than willows. An outer fringe of oak woodland habitat, scattered mature sycamore trees and riparian woodland/scrub areas closer to the creek bed characterizes the habitat onsite. In several locations, particularly downstream, sycamore density increases as the floodplain broadens.

Overall, the stream system appeared healthy with no evidence of significant die back due to drought conditions. Willows are adapted to frequent flooding and can often be observed re-rooted where they lay. Riparian systems overall are adapted to long periods of drought stress. Oak and sycamores are adapted through the used of deep groundwater aquifers. Willows and cottonwoods will often abruptly drop their leaves and enter dormancy early when under drought stress. This will be an important indicator during the year of monitoring. There were no observations of significant or even minimal oak impacts. The sycamores, while dormant did not appear to be negatively affected. Some leaf buds were evident, and there was no evidence of die back, rotting, or other types of mortality within this species. The herbaceous layer was typical of late winter and early spring. During the May sampling period we would expect to find more annuals and denser habitat within the understory.

This report is provided as a baseline analysis, however it does not appear initially that the groundwater well usage has affected the phenology of the plant species in any portion of the riparian habitat as shown in Table 32. Along all of the transects, leaf buds are appearing on most of the willows. The sycamores, for the most part, remain dormant. In general, both the oak and sycamore trees appear healthy at all sampling locations along the creek as shown in Table 33. Although no mortality of sycamore or oak trees were noted, Table 33 does show several dead willow trees. These trees were predominantly lying over, or had broken and dead limbs. Although it is likely this is from flowing and other natural occurrences this will be watched closely as the year progresses.
Table 32
Estimates of Tree Cover
(February 2000)

Willows (*Salix goodingii*):

<table>
<thead>
<tr>
<th>Transect</th>
<th>Deciduous</th>
<th>Leaf Buds</th>
<th>Full Leaf</th>
<th>Dead*</th>
<th>Partially Dead*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite 1</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Onsite 2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
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<td>Down S.1</td>
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<td>0</td>
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<td>1</td>
</tr>
<tr>
<td>Down S.2</td>
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<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Down S.3</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Up S. Sycamore</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

*represented by fallen or broken branches

Sycamores (*Platanus racemosa*):

<table>
<thead>
<tr>
<th>Transect</th>
<th>Deciduous</th>
<th>Leaf Buds</th>
<th>Full Leaf</th>
<th>Dead*</th>
<th>Partially Dead*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>Onsite 2</td>
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<td>7</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Down S.3</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>3</td>
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<td>Up S. Sycamore</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
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<td>Up S. Thompson</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Oaks (*Quercus agrifolia*):

<table>
<thead>
<tr>
<th>Transect</th>
<th>Deciduous</th>
<th>Leaf Buds</th>
<th>Full Leaf</th>
<th>Dead*</th>
<th>Partially Dead*</th>
<th>Total</th>
</tr>
</thead>
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<td>N/A</td>
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<td>0</td>
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<td>16</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>17</td>
</tr>
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<td>0</td>
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<td>0</td>
<td>5</td>
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Table 33
Estimates of Tree Health
(February 2000)

Willows (*Salix goodingii*):

<table>
<thead>
<tr>
<th>Transect</th>
<th>Poor</th>
<th>Moderate</th>
<th>Good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite 1</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Onsite 2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Down S.1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Down S.2</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Down S.3</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Up S. Sycamore</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Up S. Thompson</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Sycamores (*Platanus racemosa*):

<table>
<thead>
<tr>
<th>Transect</th>
<th>Poor</th>
<th>Moderate</th>
<th>Good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite 1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Onsite 2</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Down S.1</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Down S.2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Down S.3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Up S. Sycamore</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Up S. Thompson</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Oaks (*Quercus agrifolia*):

<table>
<thead>
<tr>
<th>Transect</th>
<th>Poor</th>
<th>Moderate</th>
<th>Good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite 1</td>
<td>0</td>
<td>1</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Onsite 2</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Down S.1</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Down S.2</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Down S.3</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Up S. Sycamore</td>
<td>0</td>
<td>1</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Up S. Thompson</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>
Diversity of herbaceous and shrub species does not appear to differ dramatically across sampling locations as shown in Table 34. Most of the understory is dominated by poison oak at all locations indicating drier floodplain. Obligated and facultative wetland species, such as yerba mansa (Anamopsis californica), mugwort (Artemisia douglasiana), and wild grape (Vitis californica), are not more prevalent upstream than onsite or downstream. Exotic, upland, or more drought tolerant species do not appear to have invaded significant portions of Thompson or Sycamore Creeks.
Table 34
Estimates of Vegetative Cover
(February 2000)

Species printed in bold are either obligate or facultative wetland species.

Parentheses after each species indicate an estimate of the percentage cover by that species taken as an average across all grids for each transect. The vegetation coverage legend is as follows: 1 = 0-25% cover; 2 = 26 - 50% cover; 3 = 51% - 75% cover; and 4 = 76 - 100% cover.

Inclusion of a species in the "ground" or the "shrub" layer was based upon height. Therefore, some species are listed as occurring in both the "ground" and the "shrub" layers.

<table>
<thead>
<tr>
<th></th>
<th>Ground</th>
<th>Shrub</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite 1</td>
<td>OVERALL: 26 - 50%</td>
<td>OVERALL: 26 - 50%</td>
</tr>
<tr>
<td></td>
<td>Avena sp. (2)</td>
<td>Baccharis glutinosa (1)</td>
</tr>
<tr>
<td></td>
<td>Artemisia douglasiana (1)</td>
<td>Toxicodendron diversilobum (1)</td>
</tr>
<tr>
<td></td>
<td>Rubus ursinus (1)</td>
<td>Conyza bonariensis (1)</td>
</tr>
<tr>
<td></td>
<td>Apiacrum angustifolium (1)</td>
<td>Quercus agrifolia (1)</td>
</tr>
<tr>
<td></td>
<td>Anemopsis sp. (1)</td>
<td>Heteromeles arbutifolia (1)</td>
</tr>
<tr>
<td></td>
<td>Brassica sp. (1)</td>
<td>Nielana glauca (1)</td>
</tr>
<tr>
<td></td>
<td>Trifolium sp. (1)</td>
<td>Urtica sp. (1)</td>
</tr>
<tr>
<td></td>
<td><em>Toxicodendron diversilobum</em> (1)</td>
<td><em>Artemisia californica</em> (1)</td>
</tr>
<tr>
<td></td>
<td><em>Elymus condensatus</em> (1)</td>
<td></td>
</tr>
<tr>
<td>Onsite 2</td>
<td>OVERALL: 51 - 75%</td>
<td>OVERALL: 26 - 50%</td>
</tr>
<tr>
<td></td>
<td><em>Toxicodendron diversilobum</em> (2)</td>
<td><em>Toxicodendron diversilobum</em> (1)</td>
</tr>
<tr>
<td></td>
<td>Avena sp. (1)</td>
<td><em>Quercus agrifolia</em> (1)</td>
</tr>
<tr>
<td></td>
<td><em>Elymus condensatus</em> (1)</td>
<td><em>Conyza bonariensis</em> (1)</td>
</tr>
<tr>
<td></td>
<td><em>Anemopsis sp.</em> (1)</td>
<td><em>Urtica sp.</em> (1)</td>
</tr>
<tr>
<td></td>
<td><em>Artemisia douglasiana</em> (1)</td>
<td><em>Sambucus mexicana</em> (1)</td>
</tr>
<tr>
<td></td>
<td>Galium sp. (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Urtica sp.</em> (1)</td>
<td><em>Rumex sp.</em> (1)</td>
</tr>
<tr>
<td></td>
<td><em>Vitis californica</em> (1)</td>
<td></td>
</tr>
<tr>
<td>Downstream 1</td>
<td>OVERALL: 51 - 75%</td>
<td>OVERALL: 26 - 50%</td>
</tr>
<tr>
<td></td>
<td><em>Toxicodendron diversilobum</em> (3)</td>
<td><em>Toxicodendron diversilobum</em> (1)</td>
</tr>
<tr>
<td></td>
<td>Avena sp. (1)</td>
<td><em>Vitis californica</em> (1)</td>
</tr>
<tr>
<td></td>
<td>Rubus ursinus (1)</td>
<td><em>Quercus agrifolia</em> (1)</td>
</tr>
<tr>
<td></td>
<td><em>Vitis californica</em> (1)</td>
<td><em>Conyza bonariensis</em> (1)</td>
</tr>
<tr>
<td>Downstream 2</td>
<td>OVERALL: 51 - 75%</td>
<td>OVERALL: 26 - 50%</td>
</tr>
<tr>
<td></td>
<td><em>Toxicodendron diversilobum</em> (2)</td>
<td><em>Quercus agrifolia</em> (1)</td>
</tr>
<tr>
<td></td>
<td><em>Artemisia douglasiana</em> (1)</td>
<td><em>Sambucus mexicana</em> (1)</td>
</tr>
<tr>
<td></td>
<td>Erodium sp. (1)</td>
<td><em>Toxicodendron diversilobum</em> (1)</td>
</tr>
<tr>
<td></td>
<td>Avena sp. (1)</td>
<td><em>Heteromeles arbutifolia</em> (1)</td>
</tr>
<tr>
<td></td>
<td>Rubus ursinus (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brassica sp. (1)</td>
<td><em>Engelmannia fasciculatum</em> (1)</td>
</tr>
<tr>
<td></td>
<td>Apiacrum angustifolium (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anemopsis sp. (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Elymus condensatus</em> (1)</td>
<td></td>
</tr>
<tr>
<td>Ground</td>
<td>Shrub</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Downstream 3</strong></td>
<td><strong>OVERALL: 26 - 50%</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quercus agrifolia (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Toxicodendron diversilobum (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sambucus mexicana (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heteromeles arbutifolia (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conyza bonariensis (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artemisia douglasiana (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OVERALL: 51 - 75%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rubus ursinus (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitis californica (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apiastrium angusifolium (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avena sp. (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trifolium sp. (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anemopsis sp. (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artemisia douglasiana (1)</td>
<td></td>
</tr>
<tr>
<td><strong>Upstream</strong></td>
<td><strong>OVERALL: 26 - 50%</strong></td>
<td></td>
</tr>
<tr>
<td>(Sycamore)</td>
<td>Quercus agrifolia (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Toxicodendron diversilobum (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artemisia californica (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conyza bonariensis (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Erigomum fasciculatum (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artemisia douglasiana (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oenothera elata (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elymus sp. (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OVERALL: 51 - 75%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rubus ursinus (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artemisia douglasiana (1)</td>
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</tr>
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<td></td>
<td>Toxicodendron diversilobum (1)</td>
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</tr>
<tr>
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<td>Ambrosia psilostachya (1)</td>
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<td>Elymus condensatus (1)</td>
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<td>Galium sp. (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urtica sp. (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitis californica (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lonicera subspicata (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rumex sp. (1)</td>
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</tr>
<tr>
<td></td>
<td>Cyperus sp. (1)</td>
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<td></td>
<td>Rorippa palustris (1)</td>
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</tr>
<tr>
<td></td>
<td>Unknown Asteraceae (1)</td>
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</tr>
<tr>
<td></td>
<td>Fern (1)</td>
<td></td>
</tr>
<tr>
<td><strong>Upstream</strong></td>
<td><strong>OVERALL: 26 - 50%</strong></td>
<td></td>
</tr>
<tr>
<td>(Thompson)</td>
<td>Quercus agrifolia (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitis californica (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Picris echinodes (1)</td>
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</tr>
<tr>
<td></td>
<td>Trifolium sp. (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apiastrium angusifolium (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artemisia douglasiana (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brassica sp. (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Toxicodendron diversilobum (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fern (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mushroom (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Juncus scutatus (1)</td>
<td></td>
</tr>
</tbody>
</table>

**Table 34 (continued)**
CHAPTER 4
Operational Plan

The following is a description of an operational plan for the Sycamore Creek Sub-basin.

Assessment of the Impact of Increased Groundwater Production

Collection of Data

1. Precipitation Data
   Collect monthly precipitation data from the Poway Valley Station No. 7111, and precipitation and temperature data from Maderas' on-site weather station when operational.

2. Groundwater Levels
   Install pressure transducers and data loggers at four bedrock wells and four shallow alluvial wells to measure static water levels. Data loggers shall record water levels a minimum of every two hours at the four bedrock wells and four shallow alluvial wells. The four bedrock wells are Maderas Wells 2 and 4, Lower Sycamore Creek Test Well and Old Coach Estates Test Well. The four alluvial wells are Monitoring Well 1 and 2 at Maderas Well 2 and Monitoring Wells 3 and 4 at Maderas Wells 4. The data will be retrieved on a weekly basis through August 31, 2000 and thereafter on a monthly basis. During the retrieval of data water levels will also be measured manually. Water levels taken manually should be measured to the nearest 0.10-foot below a consistent reference point consistent with the data loggers and recorded with the date and time. Manual water levels should be taken at the same time at the following additional wells.

- Maderas Wells 1, 3, 5 and 6
- Malone Well
- Myers Well
- Tremble Wells (2)
- Sawzack Wells (3), if possible
- Barkin Well
- Tamayo Well
• San Dieguito River Park Well
• Blum Wells (3), if possible

3. Production

Record on a weekly basis the flow meter readings for each of the five Maderas wells equipped with pumps through August 31, 2000 and thereafter on a monthly basis. The totalizer reading should be noted at the time the water levels are measured. Production volumes should be calculated for each well. Data shall be provided to the City of Poway’s consultant for review.

4. Riparian Transects

Install shallow riparian monitoring wells at each transect location. Measure water levels at the transect wells on a weekly basis through August 31, 2000 and on a monthly basis thereafter. Assess the health of the vegetation at each transect for the first year during May, August and October.

Pumping

Allow homeowner pumps to pump groundwater for their current uses and Maderas Golf Club to pump one-third (maximum of 150 acre-feet) of their water requirements until August 31, 2000, if groundwater levels should stabilize at or above 80 feet below ground surface at the Lower Sycamore Creek Test Well and at or above 120 feet below ground surface at the Old Coach Estates Test Well. However at no time shall the depth to water at Lower Sycamore Creek Test Well exceed 100 feet below ground surface.

Prior to groundwater production by Maderas Golf Club water levels at the Old Coach Estates have shown significant declines. The hydrograph, presented in Chapter 2 of this report, shows that in the past water levels at the Old Coach Estates Test Well (OCETW) have declined to approximately 217 feet below ground surface (October, 1996). Thus, in recognition that water levels at the Old Coach Estates Test Well have significantly declined prior to groundwater production by Maderas the depth to water at Old Coach Estates Test Well shall not exceed 180 feet below ground surface.
After September 1, 2000, Maderas Golf Club may adjust its groundwater production to one-twelfth of 256 acre-feet (or 21.3 acre-feet) until the end of the fiscal year, September 30, 2000. For the first fiscal year (October 1, 2000 to September 30, 2001), allow Maderas Golf Club to pump up to 326 acre-feet. After one fiscal year (October 1, 2000 to September 30, 2001) of operation, evaluate the impact of groundwater production for any possible change and evaluate the quantity of groundwater that may be pumped in the next year.

If the depth to water criteria are exceeded, groundwater production will be terminated for a minimum of two weeks and until water levels recover to 40 feet above the designated water level criteria. When these criteria are met, pumping will resume at 75 percent of the prior rate for the remainder of that fiscal year. If the depth to water criteria is exceeded again, the process will be repeated.

These criteria shall be in effect until Maderas deepens the wells in the Lower Sycamore Creek area. The pumping criteria will be renegotiated when the wells have been deepened.

Due to the fractured rock environment, the representativeness of the water levels at Old Coach Estates Test Well to other wells in the Old Coach Estates is uncertain. Water level data collected from other Old Coach Estate wells, as proposed in the Operational Plan, will be used to evaluate the representativeness of the test well. Based on this review, it may be necessary to adjust groundwater production based on water levels at the other Old Coach Estates wells that are being monitored.

**Evaluation of Quantity of Groundwater Available for Production**

At the completion of the first fiscal year Maderas Golf Club shall prepare a report summarizing groundwater production from the basin in the first fiscal year, purchased potable water from the City of Poway, water level response to groundwater production and riparian response to groundwater production. The fiscal year shall be defined October 1 through September 30.
Reporting

Maderas Golf Club will submit their first written report to the City of Poway by December 1, 2001. The report shall summarize the operations of the previous year. The reporting requirement shall be for a period of five years. After five years Maderas Golf Club shall maintain all records at their office and shall annually provide the records to the City of Poway at the City’s request.

Protection of Riparian Habitat

To protect and study the riparian habitat, monitoring should be performed throughout the summer of 2000 at the four shallow wells and pumping wells on the golf course, the details of these wells are included as Appendix C. During this monitoring season, we recommend the following course of action to protect the riparian habitat.

1. Install pressure transducers and data loggers at each of the four shallow on site riparian monitoring wells and in the nearby pumping wells (Well 2 and 4).

2. Submit specific locations for six shallow off-site monitoring wells to the City and their geotechnical consultant for review and approval prior to installation. Obtain the permission of the property owners for the shallow monitoring wells. Piezometers shall be placed to the depth of 15 feet in each well. Appendix J shows the details of these wells.

3. Retrieve and analyze the data from the data loggers weekly until August 31, 2000 and monthly thereafter. Monitor groundwater elevations of the eight shallow riparian monitoring wells at the monthly. If water levels in the alluvial shallow monitoring wells reach 15 feet below ground surface in MW-2 or MW-4 the health of the riparian vegetation will be assessed immediately by Maderas’ biologist and groundwater production at Maderas Golf Club’s Wells 2 and 5 shall cease until the water levels in the shallow alluvial wells recovers to 10 feet below ground surface. If the water level in the shallow monitoring wells (MW-2 or MW-4) further declines to 20 feet below ground surface groundwater production shall cease at Maderas Golf Club Wells 1, 3 and 4 until the water levels in the shallow alluvial wells recovers to 15 below ground surface.
4. A qualified biologist retained by Sunroad Enterprises shall perform monthly qualitative inspections of the eight transects for the first year. After a full year of results, the frequency of transect inspections shall be evaluated for adjustment to a less frequent or more frequent interval.

5. The biologist retained shall also perform and submit a quantitative transect survey for August 2000, October 2000 and January 2001. The riparian monitoring report shall include a photo inventory in digital format so the health of the riparian trees and plants can be visually assessed. The photos shall be correlated to a map of the riparian areas.

Mitigation and Monitoring Requirements for Potential Impacts to Wetland and Riparian Resources

In the event the use of groundwater by Sunroad and/or the operation and maintenance of the Maderas Golf Club results in any direct or indirect impacts to wetland and riparian resources, the following mitigation and monitoring requirements shall be implemented by Sunroad to satisfaction of the Director of Development Services.

1. A “Compensation Mitigation Plan” shall be prepared by the qualified biologist retained by Sunroad. The plan shall be submitted to the Development Services Department for review and approval. This plan shall identify the specific location of the impact(s), quantify the impact(s) and recommend “compensation mitigation” in compliance with Section 7.4 of the Poway Subarea Habitat Conservation Plan (Poway HCP).

2. A minimum five (5) year “Mitigation Monitoring, Reporting, and Maintenance Program” shall be prepared by the qualified biologist retained by Sunroad Enterprises. This program shall be submitted to the Development Services Department for review and approval. The program shall include appropriate monitoring and reporting requirements, maintenance and success criteria, and plant replacement guidelines. The program shall be consistent with and further the conservation objectives of the Poway HCP, and shall ensure the successful completion of all identified mitigation measures.
REFERENCES


APPENDIX "B"
MADERAS GOLF CULB
## WELL COMPLETION REPORT

**Owner's Well No.**: Three  
**Date Work Began**: 11/16/97, **Ended**: 11/18/97  
**Local Permit Agency**: Dept of Env. Health  
**Permit No.**: 463474, **Permit Date**: 11/14/97

### GEOLOGIC LOC

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Sandy fill - red/brown color</td>
</tr>
<tr>
<td>4</td>
<td>Decomposed granite - grey color</td>
</tr>
<tr>
<td>30</td>
<td>Granite - grey color</td>
</tr>
<tr>
<td>165</td>
<td>Fracture - seepage water</td>
</tr>
<tr>
<td>165</td>
<td>Granite - granite-tonalite - dark grey color</td>
</tr>
<tr>
<td>385</td>
<td>Granite with some fracturing - water - 20 gpm</td>
</tr>
<tr>
<td>425</td>
<td>Granite - hard - grey color</td>
</tr>
<tr>
<td>550</td>
<td>Granite with fracturing - additional water - 20 gpm</td>
</tr>
<tr>
<td>660</td>
<td>Granite - solid - grey color</td>
</tr>
</tbody>
</table>

### WATER SUPPLY

- Domestic  
- Poly  
- Irrigation  
- Industrial  
- "Test Well"  
- "Cathodic Protection"  
- Other (Specify)

**WELL LOCATION**  
- Address: 1453 Fraser Rd, Suite 1000  
- City: San Diego  
- County: San Diego  
- APN Book: 221, Page 120, Parcel 01

### ACTIVITY

- **New Well**

### DRILLING METHOD

- **Rotary**  
- **Air/water**

### WATER LEVEL & YIELD OF COMPLETED WELL

- Depth of Static Water Level: 35 ft  
- Date Measured: 11/18/97  
- Estimated Yield: 40 gpm  
- Test Type: Std/11st  
- Test Length: 0 min  
- Total Drawdown: 500 ft

### TOTAL DEPTH OF BORING: 850 ft  
### TOTAL DEPTH OF COMPLETED WELL: 750 ft

### ATTACHMENTS (X)

- Geologic Log  
- Well Construction Diagram  
- Geophysical Log(s)  
- Soil/Water Chemical Analyses  
- Other (MAP)

### CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

**Name**: Rain Drilling & Pump Co Inc.

**Address**: 12029 Old Castro Rd, Valley Center, CA 92082

**Signature**: [Signature]

**Date**: 11/20/97  
**State**: CA  
**Phone #**: 328287

### COLUMNS

<table>
<thead>
<tr>
<th>Depth From Surface (ft)</th>
<th>Borehole Diameter (inches)</th>
<th>Type (X)</th>
<th>Material/Grade</th>
<th>Internal Diameter (inches)</th>
<th>Gauge or Wall Thickness</th>
<th>Slot Size (inches)</th>
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<tr>
<td>0</td>
<td>12</td>
<td>X</td>
<td>A-53</td>
<td>8</td>
<td>0.188</td>
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<table>
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<th>Depth From Surface (ft)</th>
<th>Casing (Inches)</th>
<th>Annular Material</th>
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<td>0</td>
<td>20</td>
<td>X</td>
</tr>
<tr>
<td>20</td>
<td>40</td>
<td>X</td>
</tr>
</tbody>
</table>

- **Geologist**: [Signature]  
- **Date**: 11/20/97  
- **State**: CA  
- **Phone #**: 328287

### OTHER (MAP)

- Attach additional information if it exists
### Geologic Log

<table>
<thead>
<tr>
<th>Depth from Surface (ft)</th>
<th>Orientation (°)</th>
<th>Description</th>
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<tbody>
<tr>
<td>0-12</td>
<td></td>
<td>Alluvial fill - silty sand, red/brown color</td>
</tr>
<tr>
<td>12-42</td>
<td>X</td>
<td>Soft, decomposed granite, gray color</td>
</tr>
<tr>
<td>43-71</td>
<td>X</td>
<td>Semi weathered rock granite, gray color</td>
</tr>
<tr>
<td>71-155</td>
<td>X</td>
<td>Granite, hard, grey color</td>
</tr>
<tr>
<td>155-480</td>
<td>X</td>
<td>Granite, hard with salt and pepper minerals</td>
</tr>
<tr>
<td>480-565</td>
<td>X</td>
<td>Granite, hard with salt and pepper minerals</td>
</tr>
<tr>
<td>565-670</td>
<td>X</td>
<td>Fracture zone (water - approx 150 gpm)</td>
</tr>
<tr>
<td>670-800</td>
<td>X</td>
<td>Fracture zone (water)</td>
</tr>
</tbody>
</table>

### Well Location Sketch

- **Location Sketch**
- **Activity**: N, NEW WELL
- **Method**: Rotary
- **Planned Use(s)**: Irrigation, Miscellaneous
- **Water Supply**: Domestic

### Depth & Yield of Completed Well

- **Total Depth of Boaring**: 800 (Feet)
- **Total Depth of Completed Well**: 800 (Feet)
- **Estimated Yield**: 200 GPM
- **Test Length**: 15 ft
- **Total Drawdown**: 500 (Feet)

### Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

**Fain Drilling & Pump Co Inc.**
12029 Old Castle Rd, Valley Center, CA 92082

**R. Fain**
12/21/97

**Address**
1655 Pratt Rd, Suite 1000
San Diego, California 92108

**APN Book 272, Page 170, Parcel 01**

**Location**: Township 13S, Range 1W, Section 19

**Latitude**: 32° 54' 0" North
**Longitude**: 117° 14' 30" West

**Drilling Method**: Rotary

**Flush**: Air & Water

**Water Level**: Depth of Pump

**Depth of State**: 65 ft, Date Measured: 11/28/97

**Test Well**: 8 ft

**Filter Pack**: Type & Size

**Casing**: Type & Size

**Annular Material**: Type & Size
OLD COACH ESTATES
**THE RESOURCES AGENCY**

**WATER WELL DRILLERS REPORT**

**NO 107325**

### OWNER:
- **Name:** [Redacted]
- **Address:** 123 Main St, San Diego, CA 92101
- **City:** San Diego
- **State:** CA
- **Zip Code:** 92101

### LOCATION OF WELL:
- **City:** San Diego
- **State:** CA
- **Zip Code:** 92101

### TYPE OF WORK (check):
- [ ] Deepening
- [ ] Reconditioning
- [ ] Destroying
- [ ] Other

### PROPOSED USE (check):
- [ ] Industrial
- [ ] Municipal
- [ ] Booster Well
- [ ] Test Well
- [ ] Other

### EQUIPMENT:
- [ ] Rotary
- [x] Air
- [ ] Cable
- [ ] Other

### CASING INSTALLED:
- **Steel:** [ ] Single
- [x] Double
- [ ] PVC
- **Other:** [ ] None

### WELL LOG:
- **Total Depth:** 315 ft
- **Depth of Completed Well:** 215 ft

#### 0 - 37 ft
- **Description:** DG
- **Material:** Water Stained Rock

#### 37 - 65 ft
- **Description:** Salt + Pepper Granite with Water Stained Rock

#### 65 - 95 ft
- **Description:** Salt + Pepper Granite with Water Stained Rock

#### 95 - 155 ft
- **Description:** Grey Granite

#### 155 - 170 ft
- **Description:** Rose Quartz + Water Stained Rock Seam - 80 GPM

#### 170 - 195 ft
- **Description:** Small Seams

#### 195 -

### OTHER:
- **Remarks:** Backed into large Rose Quartz Seam - 80 GPM

### CONSTRUCTION:
- [ ] Water table not present
- [ ] Water table present
- [ ] Water table present
- [ ] Water table present

### WATER LEVELS:
- **Initial Water Level:** 195 ft
- **Depth before perforating:** 0 ft
- **Depth after perforating:** 37 ft

### WELL TESTS:
- **Flow:** 80 GPM
- **Flow Rate:** [ ] No
- **Flow Rate:** [x] Yes

### WELL DRILLER'S STATEMENT:
- **Name:** B & J Drilling Co Inc
- **Address:** 123 Main St, San Diego, CA 92101
- **License No.:** 249012
- **Dated:** 10-19-75

---

**SKETCH LOCATION OF WELL ON REVERSE SIDE**

---

**WR 188 (REV 9-68):**

---

**STANDARD TRIP CHARGE (CP):**
WATER WELL AND WATER USE SURVEY

- How many wells are on your property? One
- Do you have the well driller’s log and construction information (well logs will be held in confidence)? No
  If so, please provide a copy with this questionnaire if possible.
- How deep are your wells? I believe it is between 100 and 150 feet deep.
  (If it is important, I can find out from our neighbors)
- Do you have any wells that you are not pumping from? No
- Do you have any wells that do not have pumps installed in them? No
- Do you remember approximately what year the wells were drilled? ~ 1976
- Do you have a water storage tank in addition to the small capacity (75 to 150 gallons) pressure tank at the well? No
- If so, what is the capacity of your storage tank? If you are not sure, provide the approximate dimensions and shape of the tank (height and diameter if cylindrical; height, width, length if rectangular).
- Do you have a flow meter on your well(s)? No
- Will you allow the golf course’s consultants to measure water levels in your well(s)? Yes
- Are you willing to cease pumping for several days and rely on your water storage capacity? No, we have no storage capacity
- Is there an opening in your well seal to insert a water level probe? I don’t think so.
  If not, will you allow an access hole to be drilled? Yes, if they cap the hole properly when finished.

NAME__________________________
Rhett Affleck
Please Print

ADDRESS__________________________
18116 Old Coach Rd., Poway, CA 92064

297-010-15

RECEIVED
MAR - 8 2000
By__________________________
**WELL COMPLETION REPORT**

**Owner's Copy**

**Owner's Well No.** 445002

**Date Work Began** 3/19/96, **Ended** 3/20/96

**Local Permit Agency** Dept of Env. Health

**Permit No.** 061505

**WELL LOCATION**

- **Name:** Gene Purvis
- **Mailing Address:** 18178 Old Coach Rd., Poway, California
- **Address:** San Diego
- **City:** San Diego
- **County:** San Diego
- **APN Book & Page:** 277 010
- **Parcel:** 16
- **Township:** 11S
- **Range:** 10E
- **Section:** 18
- **State:** CA
- **Latitude:** 33° 13' 30"N
- **Longitude:** 116° 45' 00"W
- **ACTIVITY (x):** NEW WELL MODIFICATION/REPAIR
- **PLANNED USE (x):** DOMESTIC WATER SUPPLY

**DEEPING METHOD:** Rotary

**FLUID:** air & water

**WATER LEVEL & YIELD OF COMPLETED WELL:**
- **Depth of Static Water Level:** 150 ft.
- **Estimated Yield:** 150 gpm
- **Test Length:** 90 days

**TOTAL DEPTH OF BORING:** 400 ft. (Feet)

**TOTAL DEPTH OF COMPLETED WELL:** 400 ft. (Feet)

**GEOLOGIC LOG**

<table>
<thead>
<tr>
<th>DEPTH FROM SURFACE</th>
<th>CASING(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ft. to Ft.</td>
<td>TYPE (x)</td>
</tr>
<tr>
<td>0 to 60</td>
<td>X</td>
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<tr>
<td>60 to 20</td>
<td>X</td>
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**ANNULAR MATERIAL**

<table>
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<th>MATERIAL</th>
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<tbody>
<tr>
<td>Ft. to Ft.</td>
<td>TYPE</td>
</tr>
<tr>
<td>0 to 20</td>
<td>X</td>
</tr>
</tbody>
</table>

**CERTIFICATION STATEMENT**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

**NAME:**

**ADDRESS:**

**SIGNATURE:**

**DATE:** 3/20/96

**STATE:** CA

**ZIP:** 92011

**ATTACHMENTS (x):**
- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other

**ATTACH ADDITIONAL INFORMATION IF IT EXISTS.**

**IF ADDITIONAL SPACE IS NEEDED, USE NEAR CONSECUTIVELY NUMBERED FORM.**

277-010-16
### Water Well Driller's Report

**Owner:**
- **Name:** Goldwin Love, C.
- **Address:** San Juan, CA 92238

**Location of Well:**
- **County:** San Diego
- **Township:** 13
- **Range:** W 6
- **Section:** 1
- **Distance from City:** 10 miles

**Type of Work:**
- **New Well**
- **Proposed Use:** Domestic

**Equipment:**
- **Type:** Rotary
- **Steel:** Other

**Casing Installed:**
- **Single or Double:** Double
- **Diameter:**
  - From ft.: 16
  - To ft.: 16
  - Diameter of Hole:
    - From ft.: 16
    - To ft.: 16

**Perforations or Screen:**
- **Rows per ft.:**
  - From ft.: 8
  - To ft.: 8

**Construction:**
- **Method of Sealing:**
- **Water Levels:**
  - Depth at which water was first found: 16 ft.
  - Standing level before perforating: 18 ft.
  - Standing level after perforating and development: 18 ft.

**Water Test:**
- **Yield:** 10 gpm
- **Temperature of Water:** 70°F

**Sketch Location of Well on Reverse Side:**
- **Number:** 277-010-16

**Well Driller's Statement:**
- **On:** 1970
- **By:** Elbridge Love

**License No:** 245 40R

---

**State Well No:** 3682

**Other Well No:**

---

**Form:** Describe by color, character, size of material, and structure:
- 0-10 Sand
- 10-15 Sandstone, Clay
- 15-20 Granite
- 20-25 Granite
- 25-30 Granite
- 30-40 Granite
- 40-50 Granite

---

**Total Depth:** 90 ft.
**Depth of Completed Well:** 50 ft.
WATER WELL AND WATER USE SURVEY

How many wells are on your property? 3

Do you have the well driller's log and construction information (well logs will be held in confidence)? If so, please provide a copy with this questionnaire if possible.

How deep are your wells? #1 - 90' #2 - 160' #3 - 400'

Do you have any wells that you are not pumping from? #1 #2

Do you have any wells that do not have pumps installed in them? Yes #1

Do you remember approximately what year the wells were drilled? #1 1973 #2 1973 #3 1996

Do you have a water storage tank in addition to the small capacity (75 to 150 gallons) pressure tank at the well? NO

If so, what is the capacity of your storage tank? If you are not sure, provide the approximate dimensions and shape of the tank (height and diameter if cylindrical; height, width, length if rectangular).

Do you have a flow meter on your well(s)? NO

Will you allow the golf course's consultants to measure water levels in your well(s)? Yes

Are you willing to cease pumping for several days and rely on your water storage capacity? Yes from #1 and #2

Is there an opening in your well seal to insert a water level probe? Yes

If not, will you allow an access hole to be drilled? Yes

NAME Gene H Purvis 476-5322
ADDRESS 18115 Old Coach Road Poway, CA 92064

1) we will do minimal hose use for several days using only pump in #3

277-010-16
WATER WELL AND WATER USE SURVEY

▷ How many wells are on your property? **ONE**

▷ Do you have the well driller's log and construction information (well logs will be held in confidence)? **No**
  If so, please provide a copy with this questionnaire if possible.

▷ How deep are your wells? **320 ft. Pump at 220 ft.**

▷ Do you have any wells that you are not pumping from? **No**

▷ Do you have any wells that do not have pumps installed in them? **No**

▷ Do you remember approximately what year the wells were drilled? **Originally in 1974 and deepened in 1978.**

▷ Do you have a water storage tank in addition to the small capacity (75 to 150 gallons) pressure tank at the well? **No**

▷ If so, what is the capacity of your storage tank? If you are not sure, provide the approximate dimensions and shape of the tank (height and diameter if cylindrical; height, width, length if rectangular).

▷ Do you have a flow meter on your well(s)? **No**

▷ Will you allow the golf course's consultants to measure water levels in your well(s)? **Yes**

▷ Are you willing to cease pumping for several days and rely on your water storage capacity? **Can't comply**

▷ Is there an opening in your well seal to insert a water level probe? If not, will you allow an access hole to be drilled? **Yes**

**NAME** Robin Bithell

**ADDRESS** 18112 Old Coach Rd

277-0101
COUNTY OF SAN DIEGO
DEPARTMENT OF PUBLIC HEALTH
1600 PACIFIC HIGHWAY, SAN DIEGO, CA 92139
WATER WELL DRILLERS REPORT

(1) OWNER:
Name: Joe Moore
Address: Old Pech Rd., Poway, California

(11) WELL LOG:
Formation: Describe by color, character, size of material and structure

(2) LOCATION OF WELL:
County: San Diego
Township, Range, and Section: 16 S 3 R W Sec 18
Distance from cities, roads, railroads, etc.
ON ABUM RD. - Poway

(3) TYPE OF WORK (Check):
New Well □ Deepening □ Reconditioning □ Destroying □
If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic □ Industrial □ Municipal □ Irrigation □
Test Well □ Other □

(5) EQUIPMENT:
Rotary □ Cable □ Other □

(6) CASING INSTALLED:
SINGLE □ DOUBLE □
If gravel packed:
Size of shoe or well ring:
Size of gravel:
Describe joint:

(7) PERFORATIONS OR SCREEN:
Type of perforation or name of screen:

(8) CONSTRUCTION:
Was a surface sanitary seal provided? Yes □ No □
If yes, note
Were any strata sealed against pollution? Yes □ No □
If yes, note
depth of strata From ft. to ft.

(9) WATER LEVELS:
Depth at which water was first found, if known: 320 ft.
Standing level before perforating, if known: ft.
Standing level after perforating and developing: ft.

(10) WELL TESTS:
Was pump test made? Yes □ No □
If yes, by whom?
Yield: gal/min. with ft. drawdown after hrs.
Temperature of water: °F
Was a chemical analysis made? Yes □ No □
Was electric log made of well? Yes □ No □

Work started 4-16 1976, Completed 4-19 1976

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true:
the best of my knowledge and belief.

NAME: B & T DRILLING CO.
(Person, firm, or corporation) (Typed or printed)
Address: 120 Box 827

(Signed) E. L. CATON
(Well Driller)
License No. 268012 Dated 5-15, 1976

SKETCH LOCATION OF WELL ON REVERSE SIDE
LOCATION

INDICATE BELOW THE EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS. INCLUDE DIMENSIONS.

[Handwritten note: Joe Moore]
Location of well in sectionized areas.
Sketch roads, railroads, streams, or other features as necessary.

Location of well in areas not sectionized.
Sketch roads, railroads, streams, or other features as necessary.
Indicate distances.

Township 13 50 N/S
Range 1 W E/W
Section No. 18
Assessor's Parcel No. 277-010-19

FOR DEPARTMENT USE ONLY
Inspection Data
Predrilling
Date Requested ____________________
By Whom ________________________
Inspection Date ____________________
Sanitarian's Approval ________________

Completed Well Construction
Date Requested ____________________
Well driller's report and Log
received in proper form Y (Yes or No)
Date 5-29-76
Date Inspected 5-25-76
Comments None
Sanitarian's Approval ________________
Date 5-25-76

Bacteriological & Chemical Data
Bac. Sample Taken 5-25-76
Required __ Date 5-25-76
Chemical Sample taken N/A
Required N/A Date ____________
Analysis Acceptable ____ (Chemical)

Approved for operation when bacteriological sample is received.

(Sanitarian)
COUNTY OF SAN DIEGO
DEPARTMENT OF PUBLIC HEALTH
WELL PERMIT APPLICATION
SAN DIEGO, CA. 92131

<table>
<thead>
<tr>
<th>TYPE OF WORK (Check)</th>
<th>USE (Check)</th>
<th>EQUIPMENT (Check)</th>
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<tbody>
<tr>
<td>New Well</td>
<td>Individual</td>
<td>Rotary Drill</td>
</tr>
<tr>
<td>Repair or Modification</td>
<td>Domestic</td>
<td>Cable Tool</td>
</tr>
<tr>
<td>Time Extension</td>
<td>Agricultural</td>
<td>Other</td>
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<tr>
<td>Destruction</td>
<td>Industrial</td>
<td>Other</td>
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<thead>
<tr>
<th>PROPOSED WELL DEPTH</th>
<th>PROPOSED CASING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. 700 Min. 350 (Feet)</td>
<td>Type Steel Depth Diameter Well or Gage</td>
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<th>SEALING MATERIAL (Check)</th>
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<td>Neat Cement □ Puddled Clay □</td>
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<tr>
<td>From to Feet</td>
<td>Cement Grout □ Concrete □</td>
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<td>From to Feet</td>
<td></td>
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<tr>
<td>From to Feet</td>
<td></td>
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<tr>
<td>From to Feet</td>
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<th>PROPOSED PERFORATIONS OR SCREEN</th>
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<td>From to Feet</td>
<td>Completion 5/23/76</td>
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<tr>
<td>From to Feet</td>
<td></td>
</tr>
<tr>
<td>From to Feet</td>
<td></td>
</tr>
<tr>
<td>From to Feet</td>
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<table>
<thead>
<tr>
<th>NAME OF WELL OWNER</th>
<th>NAME OF WELL DRILLER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe Moore</td>
<td>Mike Milos</td>
</tr>
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<table>
<thead>
<tr>
<th>LOCATION OF WELL</th>
<th>COMPANY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Coach Road, Poway</td>
<td>B&amp;J Drilling Co</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>DISPOSITION OF APPLICATION (FOR HEALTH OFFICERS USE ONLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ APPROVED □ DENIED □ APPROVED WITH CONDITIONS</td>
</tr>
</tbody>
</table>

Report Reason(s) for Denial or Necessary Conditions Here:

$25 Fee paid on K48329 4-23-76

I hereby agree to comply with all regulations of the Department of the Public Health and with all ordinances and laws of the County of San Diego and of the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work I will furnish the Department of Public Health with a complete and accurate log of the well.

Ernest E. Nelson
HEALTH OFFICER
4-23-1976

Michael Milos
APPLICANT'S SIGNATURE
4-23-76
COUNTY OF SAN DIEGO
DEPARTMENT OF PUBLIC HEALTH
1600 PACIFIC HIGHWAY, SAN DIEGO, CA 92101
WATER WELL DRILLERS REPORT

(1) OWNER:
Name: [Handwritten]
Address: Old Coach Rd 12/1

(2) LOCATION OF WELL:
County: [Handwritten]
Township, Range, and Section:
Distance from cities, roads, railroads, etc.: [Handwritten]

(3) TYPE OF WORK (Check):
New Well □ Deepening □ Reconditioning □ Destroying □
If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic □ Industrial □ Municipal □ Irrigation □ Test Well □ Other □

(5) EQUIPMENT:
Rotary □ Cable □ Other □

(6) CASING INSTALLED:
STEEL: □ DOUBLE □
If gravel packed:
Size of shoe or well ring: □
Size of gravel: □
Describe joint:

(7) PERFORATIONS OR SCREEN:
Type of perforation or name of screen:
From ft. To ft. Perf. per row Rows per ft. Size in. x in.

(8) CONSTRUCTION:
To what depth Was a surface sanitary seal provided? Yes □ No □ depth ft.
Were any strata sealed against pollution? Yes □ No □ If yes, note
depth of strata From ft. to ft.

(9) WATER LEVELS:
Depth at which water was first found, if known ft.
Standing level before perforating, if known ft.
Standing level after perforating and developing ft.

(10) WELL TESTS:
Was pump test made? Yes □ No □ If yes, by whom?
Yield: gal/min. with ft. drawdown after hrs.
Temperature of water Was a chemical analysis made? Yes □ No □
Was electric log made of well? Yes □ No □ If yes, attach copy

(11) WELL LOG:
Total depth ft. Depth of completed well ft
Formation: Describe by color, character, size of material and structure ft. to

SKETCH LOCATION OF WELL ON REVERSE SIDE
OVER

SAN 52 (9-74)

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME: [Handwritten]
Address: PO Box 827
[Signature] [Handwritten]
License No. 228012 Dated 5-15-97
LOCATION

INDICATE BELOW THE EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS. INCLUDE DIMENSIONS.
WATER WELL AND WATER USE SURVEY

- How many wells are on your property? [ ] One

- Do you have the well driller’s log and construction information (well logs will be held in confidence)? If so, please provide a copy with this questionnaire if possible.

- How deep are your wells? 5/31/96 DRILLED TO 4231

- Do you have any wells that you are not pumping from? NO

- Do you have any wells that do not have pumps installed in them? NO

- Do you remember approximately what year the wells were drilled? 5/31/96 DRILLED

- Do you have a water storage tank in addition to the small capacity (75 to 150 gallons) pressure tank at the well? (TWO 300 GAL. PRESSURE TANKS ONLY)

- If so, what is the capacity of your storage tank? If you are not sure, provide the approximate dimensions and shape of the tank (height and diameter if cylindrical; height, width, length if rectangular). 600 GALLONS

- Do you have a flow meter on your well(s)? NO

- Will you allow the golf course’s consultants to measure water levels in your well(s)? YES

- Are you willing to cease pumping for several days and rely on your water storage capacity? (NO)

- Is there an opening in your well seal to insert a water level probe? YES
  If not, will you allow an access hole to be drilled? YES

NAME         JOE H. MOORE
Please Print

ADDRESS       1 SLOPE COACH ROAD, POWAY, CA 10041

277-010-19
## County of San Diego Department of Public Health

### WELL PERMIT APPLICATION

1600 Pacific Highway
San Diego, CA. 92101

**Permit No. 22037**

<table>
<thead>
<tr>
<th>TYPE OF WORK (Check)</th>
<th>USE (Check)</th>
<th>EQUIPMENT (Check)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Well</td>
<td>Individual</td>
<td>Rotary Air</td>
</tr>
<tr>
<td>Repair or Modification</td>
<td>Domestic</td>
<td>Cable Tool</td>
</tr>
<tr>
<td>Time Extension</td>
<td></td>
<td>Other</td>
</tr>
<tr>
<td>Destruction</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROPOSED WELL DEPTH</th>
<th>PROPOSED CASING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. 600 Min. 100 (Feet)</td>
<td>Type: Steel</td>
</tr>
<tr>
<td></td>
<td>Depth: 20'</td>
</tr>
<tr>
<td></td>
<td>Diameter: 6 5/8</td>
</tr>
<tr>
<td></td>
<td>Wall or Gage: 18'8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROPOSED SEALING ZONE(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 0 to 20 Feet</td>
</tr>
<tr>
<td>From to</td>
</tr>
<tr>
<td>From to</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEALING MATERIAL (Check)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neat Cement</td>
</tr>
<tr>
<td>Puddled Clay</td>
</tr>
<tr>
<td>Cement Grout</td>
</tr>
<tr>
<td>Concrete</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DATE OF WORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start: As Soon As Possible</td>
</tr>
<tr>
<td>Completion: Within 120 Days</td>
</tr>
</tbody>
</table>

### NAME OF WELL OWNER

**Paul Kern**
18108 Old Coach Rd

### LOCATION OF WELL

Approx. 3 mi. on Old Poway-Coach Rd off Espola Rd.

### NAME OF WELL DRILLER

**Joseph Sayatovich**

### COMPANY

**Pioneer Drilling**

### BUSINESS ADDRESS

8652 Magnolia Ave San Diego

### LICENSE NUMBER

264/57

---

**RECEIVED**

**2-17-77**

**SAN 33 (9-74)**

---

I hereby agree to comply with all regulations of the Department of the Public Health and with all ordinances and laws of the County of San Diego and of the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work I will furnish the Department of Public Health with a complete and accurate log of the well.

**Applicant's Signature**

**Date**

---

**Health Officer**

**Date**

---

**Cash Deposit**

**Bond Posted**

---

$25 Fee paid on 3-13-77
LOCATION

INDICATE BELOW THE EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS. INCLUDE DIMENSIONS.

Paul Ram - APPROX 3 MILE ON OLD COAST RD OFF ESPOLIA RD

Well site over 50' from any boundary
**COUNTY OF SAN DIEGO**
**DEPARTMENT OF HEALTH SERVICES**

**WELL PERMIT APPLICATION**

<table>
<thead>
<tr>
<th>TYPE OF WORK (Check)</th>
<th>USE (Check)</th>
<th>EQUIPMENT (Check)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Well X</td>
<td>Individual Domestic X</td>
<td>Rotary X</td>
</tr>
<tr>
<td>Repair or Modification</td>
<td>Agricultural</td>
<td>Cable Tool</td>
</tr>
<tr>
<td>Time Extension</td>
<td>Community</td>
<td>Other Tool</td>
</tr>
<tr>
<td>Destruction</td>
<td>Industrial</td>
<td>Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROPOSED WELL DEPTH</th>
<th>PROPOSED CASING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. 800'</td>
<td>Type Steel</td>
</tr>
<tr>
<td>Min. 300'</td>
<td>Depth 24'</td>
</tr>
<tr>
<td>(Feet)</td>
<td>Diameter 8&quot;</td>
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<tr>
<td></td>
<td>Wall or Gage 185</td>
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</table>

<table>
<thead>
<tr>
<th>PROPOSED SEALING ZONE(S)</th>
<th>SEALING MATERIAL (Check)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From to Feet</td>
<td>Neat Cement Grout X</td>
</tr>
<tr>
<td>From to Feet</td>
<td>Bentonite Clay</td>
</tr>
<tr>
<td>From to Feet</td>
<td>Sand Cement Grout</td>
</tr>
<tr>
<td>From to Feet</td>
<td>Concrete</td>
</tr>
<tr>
<td>From to Feet</td>
<td>Other-Specify: 1/4% bentonite</td>
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</table>

<table>
<thead>
<tr>
<th>PROPOSED PERFORATIONS OR SCREEN</th>
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</thead>
<tbody>
<tr>
<td>From to Feet</td>
</tr>
<tr>
<td>From to Feet</td>
</tr>
<tr>
<td>From to Feet</td>
</tr>
<tr>
<td>From to Feet 876</td>
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<table>
<thead>
<tr>
<th>DATE OF WORK</th>
</tr>
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<tbody>
<tr>
<td>Start 7/30/94</td>
</tr>
<tr>
<td>Completion 8/1/94</td>
</tr>
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</table>

**NAME OF WELL OWNER**
301 S. COLOMBO BLVD
PASADENA, CA 91101

**NAME OF WELL DRILLER**
EMR RAINBOW
E. R. 749-8530

**LOCATION OF WELL**
1377 C Deer Valley Estate Rd.

**BUSINESS ADDRESS**
19223 Paradise View Cir.

**LICENSE NUMBER**
54579.7

**Fee paid on**

**I hereby agree to comply with all regulations of the Department of Health Services and with all ordinances and laws of the County of San Diego and of the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work I will furnish the Department of Health Services with a complete and accurate log of the well.**

**HEALTH OFFICER**

**APPLICANT'S SIGNATURE**

**DATE**

---

**Page 1 of 2**
INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEwers AND PRIVATE SEwAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.

No building on beach fields

Scale 1" = Appx 401' (41 AC.)

Revised location per well trailer
Rldr. 7-27-94

Thos. Bro.
P9,1050 5-6

DHS:EHP-731 (3/85)
WELL COMPLETION REPORT

For Local Requirements Refer to Instruction Pamphlet

Owner's Well No. 45414

Date Work Began 10/21/94, Ended 12/31/94

Local Permit Agency San Diego County Health Dept.

Permit No. 575981 Permit Date 12/23/94

Name Howard Johnson (Chula Vista, Calif.)

Mailing Address 1631 W. Del Cerro Rd., STE 0-5

Clearwater Dr., 92035

Address 1631 W. Del Cerro Rd.

City Chula Vista, 92035

County San Diego

Towship 19S Range 4W Section 17

Latitude 32° 49' 57"

Longitude 117° 6' 0"

LOCATION SKETCH

TOTAL DEPTH OF BORING 601 (Feet)

TOTAL DEPTH OF COMPLETED WELL 601 (Feet)

DEEP FROM SURFACE  BORE-HOLE DIA. (Inches)  TYPE  CASING(S)

0 50 10 x steel 64 .153 none

DEEP FROM SURFACE ANNULAR MATERIAL

0 22 x

22 50 x

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

Name Randazzo Drilling Service RDS

Address 1982 Paradise Pl., Rd. Valley Center, CA. 92082

Signed 8/9/94

STATE WELL NO./STATION NO. 575981

LATITUDE 32° 49' 57"

LONGITUDE 117° 6' 0"

APN: 183 OTHER

STATE ZIP

WELL LOCATION

NEW WELL MODIFICATION/REPAIR

Deepen

Other (Specify)

DESTROY (Describe Procedures and Materials, Under "GEOLOGIC LOG"

WATER SUPPLY

Domestic

Public

Irrigation

Industrial

"TEST WELL"

CATHODIC PROTECTION

Other (Specify)

WATER LEVEL & YIELD OF COMPLETED WELD

DEPTH OF STATIC WATER LEVEL 55 (FT) & DATE MEASURED 12/23/94

ESTIMATED YIELD 55 (GPM) & TEST TYPE AIR LIFT

TEST LENGTH 18 (FT) TOTAL DRAWDOWN 18 (FT)

* May not be representative of a well's long-term yield.

ATTACHMENTS (X)

Geologic Log

Well Construction Diagram

Geophysical Log(s)

Soil/Water Chemical Analyses

Other

ATTACH ADDITIONAL INFORMATION IF IT EXISTS.

DWR 158 Rev. 7-90

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM
### WELL PERMIT APPLICATION

**COUNTY OF SAN DIEGO**  
**DEPARTMENT OF PUBLIC HEALTH**  
1600 PACIFIC HIGHWAY  
SAN DIEGO, CA. 92110  

**Permit No.** 22313  

#### TYPE OF WORK (Check)
- [ ] New Well  
- [ ] Repair or Modification  
- [ ] Time Extension  
- [ ] Destruction  

#### USE (Check)
- Individual  
- Domestic  
- Commercial  
- Agricultural  
- Community  
- Industrial  
- Other  

#### EQUIPMENT (Check)
- Air Rotary  
- Cable Tool  
- Other  

---

#### PROPOSED WELL DEPTH

Max. 800 Min. 200 (Feet)  

#### PROPOSED CASING

Type Steel  
Depth 20  
Diameter 6  
Wall or Gage 188  

#### PROPOSED SEALING ZONE(S)

From _______ to _______ Feet  
From _______ to _______ Feet  
From _______ to _______ Feet  

#### PROPOSED PERFORATIONS OR SCREEN

From _______ to _______ Feet  
From _______ to _______ Feet  
From _______ to _______ Feet  
From _______ to _______ Feet  

#### SEALING MATERIAL (Check)

- Neat Cement  
- Puddled Clay  
- Cement Grout  
- Concrete  

#### DATE OF WORK

Start 11-20-78  
Completion 11-23-78  

---

#### NAME OF WELL OWNER

**Bud Murphy**

#### LOCATION OF WELL

Coach Road, Poway

#### DISPOSITION OF APPLICATION (FOR HEALTH OFFICERS USE ONLY)

- [ ] APPROVED  
- [ ] DENIED  
- [ ] APPROVED WITH CONDITIONS

Report Reason(s) for Denial or Necessary Conditions Here:

---

#### BUSINESS ADDRESS

**PO Box 445 Buchan, CA, 92114**

**LICENSE NUMBER**

297450  

**Cash Deposit**  
Bond Posted  

$25 Fee paid on 11/17/78

---

I hereby agree to comply with all regulations of the Department of the Public Health and with all ordinances and laws of the County of San Diego and of the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work I will furnish the Department of Public Health with a complete and accurate log of the well.

**Applicant's Signature**

**Bud Morrison**

**Date**

11-7-78

---

**San Diego Health Commission**

**Date**

11-7-78

---

**Ramona**
LOCATION

INDICATE BELOW THE EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS. INCLUDE DIMENSIONS.

Emil Murphy
13368 Calle Colina
Poway CA.
### WATER WELL DRILLERS REPORT

**State of California**
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

**Notice of Intent No.:** 123/3

**Local Permit No. or Date:**

<table>
<thead>
<tr>
<th>(1) OWNER:</th>
<th>Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
<td></td>
</tr>
<tr>
<td>City:</td>
<td></td>
</tr>
<tr>
<td>Zip:</td>
<td>90614</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>(2) LOCATION OF WELL (See instructions):</th>
</tr>
</thead>
<tbody>
<tr>
<td>County: MARSHALL</td>
</tr>
<tr>
<td>Well address different from above:</td>
</tr>
<tr>
<td>Township: 1</td>
</tr>
<tr>
<td>Distance from cities, roads, railroads, fences, etc.:</td>
</tr>
</tbody>
</table>

**WELL LOCATION SKETCH**

<table>
<thead>
<tr>
<th>(3) TYPE OF WORK:</th>
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</thead>
<tbody>
<tr>
<td>New Well</td>
</tr>
<tr>
<td>Reconditioning</td>
</tr>
<tr>
<td>Horizontal Wall</td>
</tr>
<tr>
<td>Destruction</td>
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</table>

<table>
<thead>
<tr>
<th>(4) PROPOSED USE:</th>
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<tbody>
<tr>
<td>Domestic</td>
</tr>
<tr>
<td>Irrigation</td>
</tr>
<tr>
<td>Industrial</td>
</tr>
<tr>
<td>Test Well</td>
</tr>
<tr>
<td>Stock</td>
</tr>
<tr>
<td>Municipal</td>
</tr>
<tr>
<td>Other:</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>(5) EQUIPMENT:</th>
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<tbody>
<tr>
<td>Rotary</td>
</tr>
<tr>
<td>Cable</td>
</tr>
<tr>
<td>Other</td>
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<tr>
<th>(6) GRAVEL PACK:</th>
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<tbody>
<tr>
<td>No</td>
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<table>
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<tr>
<th>(7) CASING INSTALLED:</th>
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<tbody>
<tr>
<td>Steel</td>
</tr>
<tr>
<td>Concrete:</td>
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</table>

<table>
<thead>
<tr>
<th>(8) PERFORATIONS:</th>
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</thead>
<tbody>
<tr>
<td>Type of perforation or size of screen:</td>
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</tbody>
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<tr>
<th>(9) WELL SEAL:</th>
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</thead>
<tbody>
<tr>
<td>Water surface sanitary seal provided: Yes</td>
</tr>
<tr>
<td>If yes, to depth:</td>
</tr>
<tr>
<td>Were strata sealed against pollution: Yes</td>
</tr>
<tr>
<td>Interval:</td>
</tr>
<tr>
<td>Method of sealing:</td>
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<table>
<thead>
<tr>
<th>(10) WATER LEVELS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth of first water, if known:</td>
</tr>
<tr>
<td>Standing level after well completion:</td>
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<table>
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<tr>
<th>(11) WELL TESTS:</th>
</tr>
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<tbody>
<tr>
<td>Water well test made: Yes</td>
</tr>
<tr>
<td>Type of test: Pump</td>
</tr>
<tr>
<td>Depth to water at start of test:</td>
</tr>
<tr>
<td>At end of test:</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Discharge:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical analysis made: Yes</td>
</tr>
<tr>
<td>Was electric log made: Yes</td>
</tr>
</tbody>
</table>

**WELL DRILLER'S STATEMENT:**

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

**SIGNED:**

**NAME:** (Person, firm, or corporation) (Typed or printed)

**Address:**

**License No.:**

**Date of this report:**

**WATER CODE SEC. 19752**

**COPY OF DENITAL WATER CODE SEC. 19752**

**NOT FOR PUBLIC USE**
**WELL COMPLETION REPORT**

**STATE OF CALIFORNIA**

**QUADRUPPLICATE**

**For Local Requirements**

**Page** of __________

**Owner's Well No.** 7-67, Ended 7-31-76

**Date Work Began** 7-4-76

**Local Permit Agency** W-318

**permit No.** W-318 Permit Date 7-4-76

---

**GEOLOGIC LOG**

<table>
<thead>
<tr>
<th>ORIENTATION</th>
<th>VERTICAL</th>
<th>HORIZONTAL</th>
<th>ANGLE (SPECIFY)</th>
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</thead>
<tbody>
<tr>
<td>DEPTH TO FIRST WATER</td>
<td>4 ft. (FL) BELOW SURFACE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

Describe material, grain size, color, etc.

---

**WELL LOCATION**

**NAME** trias

**MAILING ADDRESS** 3016 Winona Drive

**CITY** Irvine

**STATE** CA

**ZIP** 92604

**PLANNED USE(S)**

- **NEW WELL**
- **ACTIVITY (s)**
- **MODIFICATION/REPAIR**
  - Deeper
  - Other (Specify)
- **DESTROY** (Describe Procedure and Materials Under "GEOLOGIC LOG")
- **PLANNED USE(S)**
- **MONITORING**
- **WATER SUPPLY**
  - Domestic
  - Public
  - Irrigation
  - Industrial
  - "TEST WELL"
  - CATHODIC PROTECTION
  - OTHER (Specify)

**DETAILS**

- **ILLUSTRATE or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc.**

**PLEASE BE ACCURATE & COMPLETE.**

**DRILLING METHOD**

- **FLUID**

**WATER LEVEL & YIELD OF COMPLETED WELL**

- **DEPTH OF STATIC WATER LEVEL**
- **DATE MEASURED**
- **ESTIMATED YIELD**
- **(GPM) & TEST TYPE**
- **TEST LENGTH**
- **(Hrs.) TOTAL DRAWDOWN**
- **(FL)**

*May not be representative of a well's long-term yield.*

**TOTAL DEPTH OF BORING** 120 ft. (Feet)

**TOTAL DEPTH OF COMPLETED WELL** 120 ft. (Feet)

---

**Casing(S)**

<table>
<thead>
<tr>
<th>DEPTH FROM SURFACE (Ft.)</th>
<th>DIAM. (Inches)</th>
<th>TYPE</th>
<th>MATERIAL/ GRADE</th>
<th>INTERNAL DIAMETER (Inches)</th>
<th>GAUGE OR WALL THICKNESS</th>
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<tbody>
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<td></td>
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**Annular Material**

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<tr>
<th>DEPTH FROM SURFACE (Ft.)</th>
<th>CASING TYPE</th>
<th>CEMENT TYPE</th>
<th>BENEFICIATE</th>
<th>FILL TYPE</th>
<th>FILTER PACK TYPE/ SIZE</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ATTACHMENTS**

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other

**CERTIFICATION STATEMENT**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

**NAME**

**ADDRESS**

**CITY**

**STATE**

**ZIP**

**SIGNED**

**DATE SIGNED**

**LICENSE NUMBER**

---

**DWR 198 REV 7.90**

**IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM**
INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.

18540 Wild Horse Cr.

PROPOSED WELL
PROPOSED GUEST HOUSE
PROPOSED TENNIS COURT

DHS:EHP-731 (3/85) Page 2 of 2
<table>
<thead>
<tr>
<th>TYPE OF WORK (Check)</th>
<th>USE (Check)</th>
<th>EQUIPMENT (Check)</th>
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<tbody>
<tr>
<td>New Well</td>
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<td>Rotary</td>
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<td>Agricultural</td>
<td>Cable Tool</td>
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<tr>
<td>Time Extension</td>
<td>Community</td>
<td>Other</td>
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<td>Destruction</td>
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<td>Other</td>
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<th>PROPOSED CASING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. 200 Min. 200 (Feet)</td>
<td>Type Steel Depth 20</td>
</tr>
<tr>
<td></td>
<td>Diameter 7&quot;</td>
</tr>
<tr>
<td></td>
<td>Wall or Gage, 156</td>
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<thead>
<tr>
<th>PROPOSED SEALING ZONE(S)</th>
<th>SEALING MATERIAL (Check)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From A to 20' Feet</td>
<td>Neat Cement Grout</td>
</tr>
<tr>
<td>From</td>
<td>Bentonite Clay</td>
</tr>
<tr>
<td>From</td>
<td>Sand Cement Grout</td>
</tr>
<tr>
<td></td>
<td>Concrete</td>
</tr>
<tr>
<td>PROPOSED PERFORATIONS OR SCREEN</td>
<td>Other-Specify:</td>
</tr>
<tr>
<td>From A to 700 Feet</td>
<td>Date of Work</td>
</tr>
<tr>
<td>From</td>
<td>Start Aug.-7-89</td>
</tr>
<tr>
<td>From</td>
<td>Completion Aug.-10-89</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAME OF WELL OWNER</th>
<th>NAME OF WELL DRILLER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manuel Da Silva</td>
<td>Bill Moffett</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOCATION OF WELL</th>
<th>COMPANY</th>
</tr>
</thead>
<tbody>
<tr>
<td>18540 Wild Horse Creek</td>
<td>McGuire Well Drilling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DISPOSITION OF APPLICATION (FOR HEALTH OFFICERS USE ONLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] APPROVED</td>
</tr>
<tr>
<td>[ ] DENIED</td>
</tr>
<tr>
<td>[X] APPROVED WITH CONDITIONS</td>
</tr>
</tbody>
</table>

Report Reason(s) for Denial or Necessary Conditions Here:

Well to be installed in accordance with State and Local Codes.

<table>
<thead>
<tr>
<th>BUSINESS ADDRESS</th>
<th>LICENSE NUMBER</th>
<th>Fee paid on</th>
</tr>
</thead>
<tbody>
<tr>
<td>1390 Denny Pl, Campo</td>
<td>312853</td>
<td></td>
</tr>
</tbody>
</table>

I hereby agree to comply with all regulations of the Department of Health Services and with all ordinances and laws of the County of San Diego and of the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work I will furnish the Department of Health Services with a complete and accurate log of the well.

<table>
<thead>
<tr>
<th>HEALTH OFFICER</th>
<th>APPLICANT'S SIGNATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-11-89</td>
<td>7-31-89</td>
</tr>
</tbody>
</table>

DHS:EHNP-731 (3/85) Page 1 of 2
INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.

NO House

NO Septic

NOTE: Enter thru Iron Gates noting Deer Valley Estates

MANUEL DA SILVA
18540 US 101
POULTRY, CA
Sec 17
T 13S
R 1W
QUADRUPPLICATE
Use to comply with local requirements

Notice of Intent No. 246092
Local Permit No. or Date 402105

(1) OWNER: Name Manuel Da Silva
Address 17405 Valle Verde Rd
City Poway ZIP 92054

(2) LOCATION OF WELL (See instructions):
County San Diego Owner's Well Number
Well address if different from above 18540 Wild Horse Creek 40 - 48 Firmly Decomposed granite
Township 13S Range 1W Section 17 Poway 48 - 57 B/W Granite
Distance from city roads, railroads, fences, etc. APNS 277-020-18

(3) TYPE OF WORK:
New Well [ ] Deepening [ ]
Reconstruction [ ] Reconditioning [ ]
Horizontal Well [ ]
Destruction [ ] (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic [ ] Irrigation [ ]
Industrial [ ] Test Well [ ]
Municipal [ ] Other [ ]

(5) EQUIPMENT:
Rotary [X] Reverse [ ]
Cable [ ] Air [ ] Bucket [ ]
Other [ ]

(6) CRATING/BACK:
Crater [ ] No [ ]
Number of bore [ ] Feet from [ ] 500 [ ]

(7) CASING INSTALLED:
Steel [X] Plastic [ ]
Concrete [ ]

(8) PERFORATIONS:
Type of perforation or size of perforation [ ]

(9) WELL SEAL:
Was surface sanitary seal provided? Yes [X] No [ ] If yes, to depth [ ] 60 ft.
Were strata sealed against pollution? Yes [X] No [ ] Interval [ ] ft.
Method of sealing [ ] Cement [ ] Grout [ ]

(10) WATER LEVELS:
Depth of first water, if known [ ] 72' [ ]
Standing level after well completion [ ] ft.

(11) WELL TESTS:
Was well test made? Yes [X] No [ ] If yes, by whom? [ ]
Type of test [ ]
Depth to water at start of test [ ] ft.
Discharge [ ] gpm after [ ] hours
Water temperature [ ]
Chemical analysis made? Yes [X] No [ ] If yes, by whom? [ ]
Was electric log made? Yes [X] No [ ]

(12) WELL LOG:
Total depth 500 ft. Completed depth 500 ft.
Formation (Describe by color, character, size or material)

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 20</td>
<td>Soft - Sandy</td>
</tr>
<tr>
<td>20 - 40</td>
<td>Soft - Sandy</td>
</tr>
<tr>
<td>40 - 48</td>
<td>Firma Decomposed granite</td>
</tr>
<tr>
<td>57 - 80</td>
<td>B/W Granite</td>
</tr>
<tr>
<td>80 - 120</td>
<td>Same as above</td>
</tr>
<tr>
<td>120 - 288</td>
<td>Red Clay to rust in color</td>
</tr>
<tr>
<td>288 - 320</td>
<td>Red Clay to rust in color</td>
</tr>
<tr>
<td>320 - 340</td>
<td>Red Clay to tan to B/W</td>
</tr>
<tr>
<td>340 - 400</td>
<td>Red color Grn/to clay color</td>
</tr>
<tr>
<td>400 - 500</td>
<td>Hard B/W red clay color</td>
</tr>
</tbody>
</table>

WATER STRATA********

Completed Well Construction
Date 8-16-89

Date Inspected 8-23-89

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Signed [ ]
Name [ ]
Address [ ]
City [ ] ZIP [ ]
License No. [ ] Date of this report [ ]
WATER WELL AND WATER USE SURVEY

- How many wells are on your property? 2

- Do you have the well driller's log and construction information (well logs will be held in confidence)? Only most recent well (9.50'). If so, please provide a copy with this questionnaire if possible.

- How deep are your wells? Approx 580' and 9.50'

- Do you have any wells that you are not pumping from? No

- Do you have any wells that do not have pumps installed in them? No

- Do you remember approximately what year the wells were drilled? 9.50' in 1996

- Do you have a water storage tank in addition to the small capacity (75 to 150 gallons) pressure tank at the well? Yes

- If so, what is the capacity of your storage tank? If you are not sure, provide the approximate dimensions and shape of the tank (height and diameter if cylindrical; height, width, length if rectangular). 2 Tanks of 17,500 each

- Do you have a flow meter on your well(s)? ?

- Will you allow the golf course's consultants to measure water levels in your well(s)? Yes

- Are you willing to cease pumping for several days and rely on your water storage capacity? Yes

- Is there an opening in your well seal to insert a water level probe? ?

If not, will you allow an access hole to be drilled?

NAME: Cary B. Babin
ADDRESS: 18540 Wild Horse Creek

277-020-18
WATER WELL DRILLERS REPORT

Notice of Intent No. 250865
Local Permit No. or Date 02-30-93

(1) OWNER: Name Larry D. Evans
Address 12731 Avenida de España
City Pismo Beach
ZIP 93449

(2) LOCATION OF WELL (See instructions):
County San Luis Obispo
Well address if different from above 12731 Avenida de España
Township 11
Range 11
Section 17
Distance from roads, railroads, fences, etc.

(3) WELL LOG: Total depth 520 ft. Completed depth 520 ft
A 50 Hard L/G and Clay rock
B 50 Hard w/ grey/orange rock
C 200 3/F and Orange coarse
D 200 3/F and Orange/Orange coarse
E 430 Frac/Granite
F 430 430 Had Hard/With Frac
G 520 Had Hard/Granite/Frac

(4) TYPE OF WORK:
New Well I
Deepening II
Reconstruction I
Reconditioning II
Horizontal Well I

(5) EQUIPMENT
Rotary Drilled I
Cable [ ] Air [ ]
Other [ ] Bucket [ ] Ratchet [ ]

(6) GRAVEL PACK:
Size 2 1/2

(7) CASING INSTALLED:
Steel [ ] Concrete [ ]

(8) PERFORATIONS
From ft. 10.1 Dia. 2.5 Cage or Wall 1369 From ft. 520 Std. size 3x10/1

(9) WELL SEAL:
Was surface screen installed? Yes [ ] No [ ]
If yes to depth 20 ft
Were strata sealed against pollution? Yes [ ] No [ ]
If yes to depth 20 ft
Method of sealing cement

(10) WATER LEVELS:
Depth of first water level (ft.) 431
Standing level after well completion 100 ft

(11) WATER TESTS:
Was well test made? Yes [ ] No [ ]
If yes to whom? [ ]
Type of test [ ]
Depth to water at start of test 100 ft
Water level at start of test 20 ft
Discharge 60 g/hr after 4 hours
Chemical analysis made? Yes [ ] No [ ]
If yes to whom? [ ]
Wax electric log made? Yes [ ] No [ ]
If yes to whom? [ ]

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
No. 336763

WELL DRILLER'S STATEMENT:
This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

(12) OTHER:

WELL DRILLER'S STATEMENT:
This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

(13) OTHER:

WELL DRILLER'S STATEMENT:
This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

(14) OTHER:

Name: [ ]
Address: [ ]
License No.: 312353
Date of this report: April 21,
INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

No. 265758

Notice of Intent No. 252350
Local Permit No. or Date WO2271

(1) OWNER: Name William R. Sperry
Address 13251 Avenida La Valencia
City Poway, Calif. ZIP 92064

(2) LOCATION OF WELL (See instructions):
County San Diego
Owner's Well Number 1
Well address if different from above Deer Valley Estates, Poway
Township 13S
Range 1W
Section 17
Distance from cities, roads, railroads, fences, etc. see map

from ft. to ft. Formation (Describe by color, character, size or material)
0 - 26 Overburden, alt. granite heavy w/grit
very broken w/clay
26 - 76 same w/black & white granite
76 - 101 BW @ 91' & harder w/alt. gran. w/grit
101 - 176 BW w/alt. gran. w/grit
176 - 226 cont. same
226 - 276 cont. same w/poss. 1 gpm @ 240'
276 - 376 cont. same w/frac @ 375'
376 - 426 Alt. gran. mixed w/BW granite
426 - 501 cont. same formation
501 - 601 cont. same formation w/frac @ 580'
581 gpm

(3) TYPE OF WORK:
New Well
Deepening
Reconstruction
Reconditioning
Horizontal Well
 Destruction (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic
Irrigation
Industrial
Test Well
Municipal

(5) EQUIPMENT:
Rotary
Reverse
Cable
Air
Other

(6) GRAVEL PACK:
Yes
No
Size
Diameter of bore 5/16

(7) CASING INSTALLED:
Steel
Plastic
Concrete

(8) PERFORATIONS:
From
To
Dia. in.
Cage or Wall
From ft.
To ft.
Slot size

+1
83
6
5/6
188
62
83
2 3/8

(9) WELL SEAL:
Was surface sanitary seal provided? Yes No
If yes, to depth ft.
Were strata sealed against pollution? Yes No
If yes, Interval ft.
Method of sealing X

(10) WATER LEVELS:
Depth of first water, if known ft.
Standing level after completion ft.

(11) WELL TESTS:
20-83 broken area; 580'

279-026-2
**WATER WELL DRILLERS REPORT**

**Notice of Intent No.:** 228796
**Local Permit No. or Date:** 426764

**Owner:** Tom Moore

**Address:** 3508 Mt. Airene Dr.

**City:** San Diego, Calif.

**Zip:** 92111

**County:** San Diego

**Well address if different from above:** Old Coach Road, Poway

**Township:** 1

**Range:** LW 17

**Distance from center roads, railroads, fences, etc.:** see map

---

**Owner's Well Number:**

**State Well No.:**

**Other Well No.:**

---

**DEPARTMENT USE ONLY**

**Well Log:** Total depth ft., Depth of completed well ft., Formed in ft., Formation (describe by color, character, and other material)

---

**WELL LOG:**

- **Depth:** 34 ft.
- **Formation:** Dug Gulch 18' more DG: rock 25, 29 w/DG layers to 34' rock 41' spackled blk/tan 55' Black & White granite 59 blk to 62' BW w/sm. frac 79' w/o.
- **Water Sample Taken:** Yes
- **Sanitarian's Approval:** Required good sample

---

**EQUIPMENT:**

- **Recovery:** Yes
- **Diameter of above:** 12" X Bucket

---

**CASING:**

- **Concrete:**
- **Perforations:** Type of perforation or size of screen

---

**WELL SEAL:**

- **Surface Sanitary Seal:** Provided
- **Interim:** 20

---

**WATER LEVELS:**

- **Concrete 0-20', backfill w/bentonite 44-47 ft.**

---

**WELL TESTS:**

- **Type of water:** Pumps, Bailer, Air life
- **Water temperature:**
- **Discharge:**
- **Chemical analysis:** Yes
- **Electric log:** Yes

---

**SIGNATURES:**

- **Well Driller:**
- **Multi Water Systems:**
- **Address:**
- **City:**
- **License No.:** 92025
- **State:**
- **Issue Date:**

---

**CONFIDENTIAL – NOT FOR PUBLIC USE – WATER CODE SEC. 13752**
INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.
WATER WELL AND WATER USE SURVEY

- How many wells are on your property? Yes

- Do you have the well driller's log and construction information (well logs will be held in confidence)?
  If so, please provide a copy with this questionnaire if possible.

- How deep are your wells?

- Do you have any wells that you are not pumping from? No

- Do you have any wells that do not have pumps installed in them? No

- Do you remember approximately what year the wells were drilled?

- Do you have a water storage tank in addition to the small capacity (75 to 150 gallons) pressure tank at the well? Yes 5000 gal.

- If so, what is the capacity of your storage tank? If you are not sure, provide the approximate dimensions and shape of the tank (height and diameter if cylindrical; height, width, length if rectangular).

- Do you have a flow meter on your well(s)? No

- Will you allow the golf course's consultants to measure water levels in your well(s)? Yes

- Are you willing to cease pumping for several days and rely on your water storage capacity? Yes

- Is there an opening in your well seal to insert a water level probe? Yes
  If not, will you allow an access hole to be drilled?

NAME: Tope Moore
Please Print

ADDRESS: 

277-020-24
ATTN: JAVID SIMINOU

WATER WELL AND WATER USE SURVEY

- How many wells are on your property?  ONE
- Do you have the well driller's log and construction information (well logs will be held in confidence)?  NO
  If so, please provide a copy with this questionnaire if possible.
- How deep are your wells?  15 FT.
- Do you have any wells that you are not pumping from?  NO
- Do you have any wells that do not have pumps installed in them?  NO
- Do you remember approximately what year the wells were drilled?  1971
- Do you have a water storage tank in addition to the small capacity (75 to 150 gallons) pressure tank at the well?  YES
  If so, what is the capacity of your storage tank? If you are not sure, provide the approximate dimensions and shape of the tank (height and diameter if cylindrical, height, width, length if rectangular).  10,000 50
- Do you have a flow meter on your well(s)?  NO
- Will you allow the golf course's consultants to measure water levels in your well(s)?  YES
- Are you willing to cease pumping for several days and rely on your water storage capacity?  YES
- Is there an opening in your well seal to insert a water level probe?  YES
  If not, will you allow an access hole to be drilled?

NAME  ANDY KUTASTY
  Please Print

ADDRESS  18772 DEER VALLEY EST. RD

© DATAN/PF/EDOLOGOSAUGH OUS  297-020-25
**WELL LOG**

<table>
<thead>
<tr>
<th>Depth from ft</th>
<th>Formation (Describe by color, character, size or material)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 110</td>
<td>GRAY GRANITE</td>
</tr>
<tr>
<td>110 - 221</td>
<td>GRAY AND WHITE GRANITE</td>
</tr>
<tr>
<td>221 - 320</td>
<td>GRAY AND BLUE GRANITE</td>
</tr>
<tr>
<td>320 - 395</td>
<td>GRANITE WATER AT 325'</td>
</tr>
</tbody>
</table>

**TYPE OF WORK:**
- New Well
- Deepening
- Reconstruction
- Reconditioning
- Irrigation
- Geothermal
- Extension

**PROPOSED USE:**
- Domestic
- Irrigation
- Industrial
- Other

**EQUIPMENT:**
- Rotary

**Casing Installed:**
- Steel

**Perforation:**
- None

**WELL SEAL:**
- Surface seal provided: Yes
- Depth of seal: 20 ft
- Strata sealed against pollution: Yes
- Method of sealing: Cement Grout

**WATER LEVELS:**
- Depth of first water known: 20 ft

**WELL TESTS:**
- Well test made: Yes
- Type of test: Pump
- Depth to water at start of test: 20 ft
- Chemical analysis made: Yes
- Electric log made: Yes

**WELL DRILLER'S STATEMENT:**

Signed: Rex E. Anderson Corp.

Name: R. Anderson

Address: 10303 Sherman Ave.

City: Lakewood, CA

License No: 92040

Date of this report: 10/29/78

TOTAL P. 99
LOCATION

The well site is located in the NE ¼ of the NE ¼ of Sec 19 T13S R1W on Old Coach Rd, approx 2 ½ miles north of Espola Road in the Poway area.

2½ acres

Old Coach road

approx 2 ½ mi to Espola road.

Robert Myers
1) **OWNER:**

- **Name:** Leonard Andrus
- **Address:** 3712 Texas St., Apt. 12
- **City:** San Diego
- **State:** CA
- **Zip:** 92117

(11) **WELL LOG:**

- **Total depth:** 200 ft.
- **Drill of completed well:** 200 ft.
- **Formation:** Describe by color, character, size of material, and structure

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 20</td>
<td></td>
</tr>
<tr>
<td>20 - 50</td>
<td>Granite</td>
</tr>
<tr>
<td>50 - 100</td>
<td>Granite</td>
</tr>
<tr>
<td>60 - 95</td>
<td>Granite - Sons</td>
</tr>
<tr>
<td>95 - 140</td>
<td>Granite - Mica</td>
</tr>
<tr>
<td>140 - 155</td>
<td>Wa 3 - 2</td>
</tr>
<tr>
<td>155 - 180</td>
<td>Milky Quartz</td>
</tr>
<tr>
<td>180 - 185</td>
<td>Seam 2 Black</td>
</tr>
<tr>
<td>185 - 200</td>
<td>Same Formation</td>
</tr>
</tbody>
</table>

(7) **PERFORATIONS OR SCREEN:**

- **Type of perforation or nature of screen:**
- **From ft.** | **To ft.** | **Perf. per ft.** | **Rows per ft.** | **Site in. g. in.** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(3) **CONSTRUCTION:**

- **Well started:** 11/10, 1975, Completed 11/14, 1975
- **Well Driller's Statement:**
  This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

- **Name:** B. & J. Drilling Co. Inc.
- **Address:** 80 Box 827
- **Signature:** A. M. E. F. (Well Driller)

(10) **WELL TESTS:**

- **Fluide, Salinity:**
- **Temperature of water:**
- **Was electric log made of well?**

(6) **CASING INSTALLED:**

- **Steel:** Double
- **OTHER:** Y/P/C
- **If gravel packed:**

<table>
<thead>
<tr>
<th>From ft.</th>
<th>To ft.</th>
<th>Diam. of Bore</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>24</td>
<td>6 7/8</td>
</tr>
</tbody>
</table>

(2) **LOCATION OF WELL:**

- **Owner's number, if any:**
- **Distance from city:**

(4) **PROPOSED USE:**

- **Domestic**
- **Industrial**
- **Municipal**
- **Rotary**
- **Air**
- **Cable**
- **Other**

(5) **EQUIPMENT:**

- **95 - 140** Granite - Mica
- **140 - 155** Wa 3 - 2
- **155 - 180** Milky Quartz
- **180 - 185** Black Quartz 75 GPM

(9) **WATER LEVELS:**

- **Depth at which water was first found, if known:**
- **Standing level before perforations, if known:**
- **Standing level after perforations and development:**

(12) **SKETCH LOCATION OF WELL ON REVERSE SIDE**

- **Sketch:** 277 - 130 - 6
(1) OWNER:
Name: FRANK VAREN
Address: 1325 Westview Dr.,
San Diego, CA 92124

(2) LOCATION OF WELL:
County: SAN DIEGO
Owner's number, if any:
Towship, Range, and Section: T25S R1W Sec 19
Distance from streets, roads, railroads, etc.: 0.5 miles

(3) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Destroying ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) EQUIPMENT:
Rotary Air ☒ Cable ☐
Cable ☒ Other ☐

(6) CASING INSTALLED:
STEEL: ☒ OTHER: ☐
SINGLE ☐ DOUBLE ☐
From ft. To ft. Dia. in. or ft. Diameter of Bore From ft. To ft.
0 6 5/8 12.

(7) PERFORATIONS OR SCREEN:
Type of perforation or name of screen:

(8) CONSTRUCTION:
As a surface sampler was provided: Yes ☒ No ☐
To what depth: 21 ft.
Were any strata sealed against pollution: Yes ☒ No ☐
If yes, note depth of strata:
From 0 to 21 ft.
Method of sealing: CEMENT & CASING

(9) WATER LEVELS:
Depth at which water was first found, if known: 21 ft.
Standing level before perforating, if known: ft.
Standing level after perforating and developing: ft.

(10) WELL TESTS:
Was pump used? Yes ☐ No ☒ If yes, by whom:
Yield: gal./min. with New draw down after hrs.
Temperature of water: °F.
Was a chemical analysis made?: Yes ☐ No ☒
If yes, attach copy
Was electric log made of well?: Yes ☐ No ☒

(11) WELL LOG:
Total depth: 280 ft. Depth of completed well: 280 ft.
Formation: Describe by color, character, size of material, and structure:
0 - 21 14 ft. 05
41 - 95 GRANITE MIXED WITH ROSE QUARTZ @ 95 ft. - 45 GPM
95 - 140 GRANITE WITH QUARTZ SEAMS
140 - 185 GRANITE WITH ROSE QUARTZ & WATER STAINLESS STEEL
185 - 2.60 BLACK GRANITE SEAM, THEN QACK INTO MIXED QUARTZ SEAMS @ 240 ft. - 17 GPM
260 - 270 - MORE ROSE QUARTZ SEAMS @ 270 ft. HIT BIG SCAM 150 GPM + more
270 - 280 ft. PRODUCED 150 GPM +

150 GPM +

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME: B & J DRILLING INC
(Signed) EL CAJON, CALIF 92022

License No. 248012 Dated: 11-4-75

SKETCH LOCATION OF WELL ON REVERSE SIDE

297-130-9
# WATER WELL DRILLERS REPORT

## Owner Information
- **Name:** Tom Tremble
- **Address:** 18049 Old Coach Rd., Poway, Calif., Zip: 92064

## Well Information
- **WELL LOG:**
  - **Total depth:** 503 ft.
  - **Formation:**
    - **0 - 350 ft.** existing bore hole
    - **350 - 375 ft.** Hard B&W granite
    - **375 - 400 ft.** same, flowing approx. 1 gpm
    - **400 - 425 ft.** same
    - **425 - 450 ft.** 435' rock, 443' broken rock
      - with sand & gray clay
      - flowing 2 gpm
    - **450 - 475 ft.** 461-463 brok. B&W weathered, then loose broken blackrock
    - **475 - 500 ft.** 479' B&W granite; 482 black
      - mostly hard black
      - 500 - 503 ft. Fracture B&W/ox.

## Proposed Use
- Domestic
- Irrigation
- Industrial
- Test Well
- Stock
- Municipal
- Other

## Well Location Sketch

### Equipment
- **Gravel Pack:**
  - **Type of gravel:**
    - **From ft.**
      - **To ft.**
        - **Dia.**
        - **Grate or Wall**
        - **Front ft.**
        - **Top ft.**

### Casing Installed
- **Type of casing:**
  - **From ft.**
    - **To ft.**
      - **Dia.**
      - **Type of perforation or hole of screen:**

### Well Seal
- **Surface sanitary seal provided:** Yes [ ] No [ ]
- **Strata sealed against pollution:** Yes [ ] No [ ]
- **Interval ft.:**

### Water Levels
- **Depth of first water:**
- **Standing level after well completion:**

### Well Tests
- **Water test made:** Yes [ ] No [ ]
- **Type of test:**
  - **Pump:**
  - **Air lift:**
- **Depth to water at start of test:**
- **At end of test:**
- **Discharge:** gal/min after:
- **Hours:**
- **Water temperature:**
- **Chemical analysis made:** Yes [ ] No [ ]
- **Electric log made:** Yes [ ] No [ ]

## Well Driller's Statement
- **Signature:** John T. Kraft
- **Name:** Multi Water Systems
- **Address:** Rt. 1, Box 68
- **City:** Escalon, Calif., Zip: 92025
- **License No.:** 755283
- **Date of this report:** 7/18/86
(1) OWNER:
Name: Tony Truhlar
Address: 456 Bear Creek Rd, Bridgeville, CA 95520
Owner's number, if any: [ ]
County [ ] Township, Range, and Section [NE - NE 19 T25]
Distance from cities, roads, railroads, etc. [R] [ ] [ ]

(2) LOCATION OF WELL:

(3) TYPE OF WORK (check):
New Well [ ] Deepening [ ] Reconditioning [ ] Destroying [ ]
If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic [ ] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(5) EQUIPMENT:
Rotary [ ] Cable [ ] Other [ ]

(6) CASING INSTALLED:

<table>
<thead>
<tr>
<th>Single [ ] Double [ ]</th>
</tr>
</thead>
</table>

(7) PERFORATIONS OR SCREEN:

(8) CONSTRUCTION:

(9) WATER LEVELS:

<table>
<thead>
<tr>
<th>Depth at which water was first found</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing level before perforating</td>
<td>ft.</td>
</tr>
<tr>
<td>Standing level after perforating and developing</td>
<td>ft.</td>
</tr>
</tbody>
</table>

(10) WELL TESTS:

Yield: [ ] [ ] [ ]
Temperature of water: [ ]
Was electric log made of well? [ ]

(11) WELL LOG:

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 20</td>
<td>Granite with fissionary quartz seams</td>
</tr>
<tr>
<td>20 - 200</td>
<td>Granite with Precambrian granite lightened in C and more quartz</td>
</tr>
<tr>
<td>200 - 215</td>
<td>Brown seams and quartzite</td>
</tr>
<tr>
<td>215 - 230</td>
<td></td>
</tr>
<tr>
<td>230 - 245</td>
<td></td>
</tr>
<tr>
<td>245 - 320</td>
<td></td>
</tr>
<tr>
<td>320 - 535</td>
<td>Picked up 5.64 more</td>
</tr>
<tr>
<td>535 - 550</td>
<td>Granite with more quartz</td>
</tr>
<tr>
<td>550 -</td>
<td>1060 PM</td>
</tr>
</tbody>
</table>

(12) WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME [ ]
Address [ ]
License No. [ ]
Dated [ ]

SKETCH LOCATION OF WELL ON REVERSE SIDE

[Sketch] 277-130-15
WATER WELL AND WATER USE SURVEY

- How many wells are on your property? 1
- Do you have the well driller's log and construction information (well logs will be held in confidence)? Yes
  If so, please provide a copy with this questionnaire if possible.
- How deep are your wells? 625 FT
- Do you have any wells that you are not pumping from? No
- Do you have any wells that do not have pumps installed in them? No
- Do you remember approximately what year the wells were drilled? 1997
- Do you have a water storage tank in addition to the small capacity (75 to 150 gal) pressure tank at the well? Yes
- If so, what is the capacity of your storage tank? If you are not sure, provide the approximate dimensions and shape of the tank (height and diameter if cylindrical; height, width, length if rectangular). 15,000 gal
- Do you have a flow meter on your well(s)? No
- Will you allow the golf course's consultants to measure water levels in your well(s)? Yes, if they promise to inform me
- Are you willing to cease pumping for several days and rely on your water storage capacity? Yes
- Is there an opening in your well seal to insert a water level probe? Yes
  If not, will you allow an access hole to be drilled?

NAME Ronald F. Stewart

Please Print

ADDRESS 19151 Old Corr. Rd. Reedy Co 92061

277-130-18
**Geologic Log**

**Orientaion (°):**
- **Horizontal Angle:** (Specify)

**Depth from Surface:**

<table>
<thead>
<tr>
<th>Ft. to Ft.</th>
<th>Material/Ground</th>
<th>Color</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>Top soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-15</td>
<td>Sandy decomposed granite</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-35</td>
<td>Weathered granite, hard - brown color</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-87</td>
<td>Hard rock - granitic - grey with black and white mineral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>87-273</td>
<td>Fracture 1st water 10 gpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>273-325</td>
<td>Hard rock - granitic - grey color with black mineral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>325-526</td>
<td>Fracture (water) 60 gpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>526-630</td>
<td>Hard rock - granitic with black mineral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>630-370</td>
<td>Additional fractures that produce water</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Location Sketch**

**WELL LOCATION**
- **City:** Poway
- **County:** San Diego
- **APN:** Book 277 Page 130 Parcel 18
- **Township:** 13 S **Range:** 18 **Section:** 19
- **Latitude:** **Longitude:**

**Planned Use(s):**
- Domestic
- **Public**
- **Irrigation**
- **Industriial**
- "TEST WELL"
- CATHODIC PROTECTION
- Other (Specify)

**Drilling Method:** Rotary

**WATER LEVEL & YIELD OF COMPLETED WELL**
- **Depth of Static Water Level:** 3.00 ft
- **Date Measured:** 3/19/96
- **Estimated Yield:** 400+ gpm
- **Test Type:** airlift
- **Test Length:** (hrs) 300

**Total Depth of Boring:** 630 ft

**Total Depth of Completed Well:** 630 ft

**Casing(s):**

<table>
<thead>
<tr>
<th>Ft. to Ft.</th>
<th>Type</th>
<th>Material Grade</th>
<th>Internal Diameter (inches)</th>
<th>Gauge or Wall Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-40</td>
<td>X</td>
<td>A-55-B</td>
<td>8</td>
<td>.188</td>
</tr>
</tbody>
</table>

**Annular Material:**

<table>
<thead>
<tr>
<th>Ft. to Ft.</th>
<th>CEMENT</th>
<th>BENTONITE</th>
<th>FILL</th>
<th>FILTER PACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Attachments:**
- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other

**Certification Statement:**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

**Name:** Fair Drilling & Pump Co Inc

**Address:** 12029 Old Castle Rd, Valley Center, California 92082

**Signature:** [Signature]

**WELL DRILLER/AUTHORIZED REPRESENTATIVE:** [Signature]

**Date Signed:** 3/19/96

**C-77 License Number:** [Number]
RAMONA
Name: Berge Hagoplen
Address: 24183 Corta Cresta
City: El Toro
County: Orange
State: CA
Zip: 92630

Geologic Log

Orientation: Vertical

Depth from Surface
- 8 ft: Fill - clayey sand and silt, red/brown color
- 92 ft: Decomposed granite - brown color
- 113 ft: Hard, semi-weathered granite - grey color (small seepage of water)
- 133 ft: Hard, massive granodiorite - salt & pepper color with overall color grey

Fracture zones:
- 295-305 ft
- 411-415 ft
- 429-435 ft
- 513-529 ft
- 619-668 ft
- 726-775 ft

No water obtained below 133 ft.
Bore hole was backfilled and destroyed as per county code.

Total Depth of Boring: 1200 ft
Total Depth of Completed Well: 0 ft

Attaching well location map.

Certification Statement:
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

Fain Drilling & Pump Co Inc
12029 Old Castle Rd, Valley Center, CA 92082

Signed: [Signature]
Date: 3/24/93
DWR 165 REV. 7-90
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM
INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.

[Map with labeled locations and distances]
**WATER WELL DRILLERS REPORT**

**OWNER:** Geographical Ventures  
Address: eagles crest rd  
City: Ramona  
County: San Diego  
State Well No.: 277-031-21

**LOCATION OF WELL:**  
Owner's Well Number:  
Well address if different from above:  
Township Range:  
Distance from cities, roads, railroads, fences, etc.:  

**NO WORK DONE**

**DEPARTMENT USE ONLY**

Completed Well Construction:  
Date:  
Data Inspected: 1-20-92  
Comments: Slab check verified that well was not drilled.

**TYPE OF WORK:**  
New Well  
Reconstruction  
Reconditioning  
Horizontal Wall  
Drainage  
Reservoirs  
Weir  
Test Well  
Stock  
Municipal  
Sanitarian's Approval:

**Equipment:**  
Rotary  
Reverse  
Cable  
Air  
Other  
Repack from to

**Materials Used:**  
Gravel packs: Yes  
Size: 
Diameter of above: 
Packed from to

**Casing Installed:**  
Steel  
Other  
Type of perforation or size of screen:

**WELL SEAL:**  
Were surface sanitary seal provided? Yes  
If yes, to depth:  
Method of sealing: sand cement

**WATER LEVELS:**  
Depth of first water, if known:  
Standing level after well completion:  

**WELL TESTS:**  
Was well test made? Yes  
If yes, by whom:  
Type of test  
Depth to water at start of test:  
At end of test:  
Discharge: gpm after hours  
Water temperature:  
Chemical analysis made? Yes  
If yes, by whom:  
Was electronic log made? Yes  
If yes, attach copy to this report

**WELL DRILLERS STATEMENT:**  
I hereby declare under penalty of perjury that the information provided in this report is true. This water well was installed in compliance with San Diego County Code and State of California, Department of Water Resources, Bulletin No. 74.

SIGNED: County well Drilling Inc.  
Name:  
Address: 17435 Highland Valley Rd.  
City: Ramona  
License No.: 244324  
Date:  

**CONFIDENTIAL – NOT FOR PUBLIC USE – WATER CODE SEC. 13752**
INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.
LOWER SYCAMORE CREEK
No. 814642

10-21-99 Ended 10-23-99

WHTCD

Name: MR & MRS DIBOLT
Mailing Address: 18353 SYCAMORE CIR RD
City: ES, CA
State: 92025

Address: SAME

Activity: NEW WELL
MODIFICATION REPAIR
- Deepen
- Other - Specify

DESTRUCTION (Describe Procedures and Materials Under GEOLOGIC LOG -)

PLANNED USES (1)
WATER SUPPLY
- Domestic
- Public
- Irrigation
- Industrial

MONITORING
TEST WELL
- Bat
- Overhead

CATHODE PROTECTION
- Direct Push
- Injection

HEAT EXCHANGE
VAPOR EXTRATION
SPARGING
REMEDY
- Other (Specify)

NEW WELL
DEPT TO FIRST WATER 85 (FT) BELOW SURFACE
DEPT OF STATIC WTR LEVEL 40 (FT) & DATE MEASURED 10-23-99
REMARKS 27 GPM & TEST TYPE AIR LIFT

TOTAL DEPTH OF BORING 380 FT
TOTAL DEPTH OF COMPLETED WELL 380 FT

WATER LEVEL & YIELD OF COMPLETED WELL

DEPT FROM SURFACE 0
UNIT (FT) 21
MATERIAL: 65L3C6
ENDS: 0

DEPT FROM SURFACE 0
UNIT (FT) 21
MATERIAL: 65L3C6
ENDS: 0

ATTACHMENTS (1)
- Geologic Log
- Well Construction Diagram
- Geophysical Logs
- Soil/Water Chemical Analyses
- Other

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME: HYDRO TECH
ADDRESS: 2330 MAIN, # B
RAMONA CA 92065

NAME: Russell Anderson
ADDRESS: 10-26
CITY: CA
STATE: 92065

IF ADDITIONAL SPACE IS NEEDED USE NEXT CONSECUTIVELY NUMBERED FORM
LOCATION

Indicate the vicinity and exact location of the well with respect to the following items: Property lines, easements, water bodies or water courses, drainage pattern, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.
**WELL OWNER**

Name: **David B. Ruzicka**  
Mailing Address: 16365 E. Cameron Cir.

**WELL LOCATION**

Address: Same

City: San Diego

County: San Diego

APN Book: 234  Page: 150  Parcel: 23

Township: Range: Section:  

Latitude: 62°  Longitude: 90°

**LOCATION SKETCH**

**PLANNED USES**

- **NEW WELL**
- **MODIFICATION/REPAIR**
- **HEATING**
- **DOMESTIC WATER SUPPLY**
- **GROUNDS MAINTENANCE**
- **INDUSTRIAL USE**
- **IRRIGATION**
- **COMMERCIAL USE**
- **OTHER SPECIFY**

**WATER LEVEL & YIELD OF COMPLETED WELL**

Depth to First Water: 155 feet below surface  
Depth of Static Water Level: 155 feet below surface  
Estimated Yield: 30 gpm & Test Type: Air

**CERTIFICATION STATEMENT**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

Name: **Hydrachem, Inc. Scott**  
Address: 2330 Main St. B  
City: San Diego  
State: CA  
ZIP: 92126

Signature: **[Signature]**  
Date: 02/07/04
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

Owner's Well No. 816525
Date Work Began 9-10-99 Ended 9-14-99
Local Permit Agency SAN DIEGO CO Permit Date 6-23-99

GEOLOGIC LOG

<table>
<thead>
<tr>
<th>ORIENTATION (S)</th>
<th>&lt; VERTICAL &lt; HORIZONTAL &lt; ANGLE &lt; SPECIFY</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>DEPTH FROM SURFACE FL</th>
<th>TRANSITION 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>TUFF SOIL</td>
</tr>
<tr>
<td>150</td>
<td>HARD BASALT</td>
</tr>
<tr>
<td>150</td>
<td>SODER - SOME CLAY</td>
</tr>
<tr>
<td>205</td>
<td>HARD BASALT</td>
</tr>
<tr>
<td>410</td>
<td>GROUT MIX - WATER &amp; CEM</td>
</tr>
<tr>
<td>410</td>
<td>HARD BASALT</td>
</tr>
<tr>
<td>515</td>
<td>GROUT MIX - 30 GPA</td>
</tr>
<tr>
<td>570</td>
<td>HARD BASALT</td>
</tr>
</tbody>
</table>


describe material, grain size, color, etc.

WELL LOCATION

| NAME: SAN DIEGO ROYAL PARK |
| Mailing Address 14372 SYLVAMURS C Tr 5 |
| City: RAMONA |
| County: SAN DIEGO |
| APN Book 272, Page 152 Parcel 32 |
| Township: 15 |
| Range: 6 |
| Section: 11 |
| Latitude: 33.1277 |
| Longitude: -117.0923 |

DEPES
DEEPEN

PLANNED USES

WATER SUPPLY

DOMESTIC
PUBLIC
INDUSTRIAL
MINE WATER
MONITORING
TEST WELL
CATHODIC PROTECTION
HEAT EXCHANGE
DIRECT PUSH INJECTION
VAPOR EXTRACTION
SPARGING
REMEDICATION
OTHER

MODIFICATION REPAIR

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 412.5 FT BELOW SURFACE
DEPT OF STATIC WATER LEVEL 1.5 FT & DATE MEASURED 9-14-99
ESTIMATED YIELD: 40 GPM & TEST TYPE: A1

TEST LENGTH: 1/2 (HFS) TOTAL DRAWDOWN: 4 FT.

TOTAL DEPTH OF BORING 570 FT
TOTAL DEPTH OF COMPLETED WELL 570 FT

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME: HYDRO TECH WELL SERVICES
ADDRESS: 2330 MAIN ST B, RAMONA, CA 92065
SIGNATURE: R. WILLIAMS, AUTHORIZED REPRESENTATIVE
DATE: 9-22-99
LICENSE NO: 7C025085

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM
LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, easements, water bodies or water courses, drainage pattern, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.
Indicate below the vicinity and exact location of well with respect to the following items: Property lines, easements, water bodies or water courses, drainage pattern, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.
How many wells are on your property? 2

Do you have the well driller’s log and construction information (well logs will be held in confidence)? NO
If so, please provide a copy with this questionnaire if possible.

How deep are your wells? 150’ 375’

Do you have any wells that you are not pumping from? YES

Do you have any wells that do not have pumps installed in them? NO

Do you remember approximately what year the wells were drilled? 1977 1999

Do you have a water storage tank in addition to the small capacity (75 to 150 gallons) pressure tank at the well? NO

If so, what is the capacity of your storage tank? If you are not sure, provide the approximate dimensions and shape of the tank (height and diameter if cylindrical; height, width, length if rectangular).

Do you have a flow meter on your well(s)? NO

Will you allow the golf course’s consultants to measure water levels in your well(s)? YES

Are you willing to cease pumping for several days and rely on your water storage capacity? NO

Is there an opening in your well seal to insert a water level probe? If not, will you allow an access hole to be drilled?

NAME Robert L. Mogavero
Please Print

ADDRESS 18385 Sycamore Creek Rd.
Escondido, CA 92025-2302

Well located 200 feet east of driveway grant, south side of road, base of steep slope.

272-150-27

Robert L. Mogavero
18385 Sycamore Creek Rd.
Escondido, CA 92025-2302
OWNER: Max Webb
Address: 1127 Almazon
City: San Diego
County: San Diego
Well address if different from above: Sylvanofe Orch Rd
Well No.: 92128

(12) WELL LOG:
Total depth: 125 ft.
Depth of completed well: 125 ft.
Formation (describe by color, character, size or material):

0 - 3 ft. D.C.
3 - 25 ft. Hard Rock
25 - 125 ft. Hard Rock

(2) LOCATION OF WELL:
County: San Diego
Owner's Well Number
Well address if different from above: Sylvanofe Orch Rd
Township:
Range:
Section:
Distance from cities, roads, railroads, lines, etc:

(3) TYPE OF WORK:
New Well
Deepening
Reconstruction
Reconditioning
Horizontal Wall
Drainage (describe in text) 24' 160'
(4) PROPOSED USE:
Domestic
Irrigation
Industrial
Test Well
Stock
Municipal

(5) EQUIPMENT:
Rotary
Reverse
Yes
No
Cable
Air
Bucket

(7) CASING INSTALLED:
Steel
Plastic
Concrete

(8) GRAYVY PACK:
Yes
No
Size:
S-225

(9) WELL SEAL:
Was surface sanitary seal provided? Yes
No
If yes, to depth: 20 ft.
Were strata sealed against pollution? Yes
No
If no, interval:
Method of sealing:

Cement Grout

(10) WATER LEVELS:
Depth of first water, if known:
Standing level after well completion: APPROX 27 ft.

(11) WELL TESTS:
Was well test made? Yes
No
If yes, by whom?: Ramonso
Type of test:

Discharge:

At end of test:

Chemical analysis made? Yes
No
If yes, by whom?:
Was electric log made? Yes
No
If no, attach copy to this report:

WELL DRILLER'S STATEMENT:
This well was drilled under my supervision and this report is true to the best of my knowledge and belief.
Signed:

Ramonso

WELL DRILLER'S CORR.
NAME:
Address:
City:
Tip:
License No.
Date of this report:
INDICATE BELOW THE EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS. INCLUDE DIMENSIONS.

PRIVATE DRIVE

- 50' - PROPOSED HOUSE

LEACH FIELD

360'

EXISTING EASEMENT ROAD (Sycamore Creek Rd.)

PROPOSED ROADWAY  MINIMUM 50 FEET FROM EDGE OF FLOOD PLAIN CHANNEL

PROPOSED LOCATION OF WELL

FLOOD PLAIN

EXISTING EASEMENT ROAD (Sycamore Creek Rd.)

HIGHLAND VALLEY ROAD  1 MILE

POMERANO ROAD

1-15

PROXIMITY MAP

LOT

SLOPE

SLOPE

SAN 53 (8-76)
**DEPARTMENT OF WATER RESOURCES**

**WATER WELL DRILLERS REPORT**

(1) **OWN NAME & ADDRESS**
- Max Wahl
- Address: 18330 Cypress Creek Rd.
- City: Reeside, California
- Zip: 92082

(2) **LOCATION OF WELL**
- County: San Diego
- Well address: Approx one mile E. 1/2
- Township: 12 B
- Range: 3
- Section: 8
- Distance from city, roads, railroads, fences, etc.: Approx 500 to 1,000 ft.

(3) **TYPE OF WORK**
- New Well

(4) **PROPOSED USE**
- Domestic
- Irrigation
- Industrial
- Other

(5) **EQUIPMENT**
- Rotary
- Cable
- Other

(6) **GRAVEL PACK**
- Yes

(7) **CASING INSTALLED**
- Yes

(8) **PERFORATIONS**
- Yes

(9) **WELL SEAL**
- Yes

(10) **WATER LEVELS**
- Depth of first water, if known: 24 ft.

(11) **WELL TESTS**
- Type of test: Air
- Depth to water at start of test: 20 ft.
- Drawdown: 200 ft.
- Discharge: 2 gpm
- Chemical analysis made: Yes

(12) **WELL LOG**
- Depth: 235 ft.
- Formation: Decomposed granite - brown color
- Hard rock, granite with some
- Fracturing - overall color

(13) **DATE OF COMPLETION**
- Work started: 9/16/81
- Completed: 9/20/81

**WELL DRILLER'S STATEMENT**

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Signed: Joe Stein

**NAME**
- Fuel Drilling & Pump Co., Inc.

**ADDRESS**
- F.O. Box 603
- City: Valley Center, California
- Zip: 92082

**LICENSE NO.**
- 328287

**DATE OF REPORT**
- 10/2/81

---

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM
LOCATION

INDICATE BELOW THE EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS. INCLUDE DIMENSIONS.
APPENDIX “C”
AS-BUILT WELL SCHEMATIC
MADERAS GOLF COURSE
MW-1 and MW-2
(Located 30 feet west of Well 2)

MW-1

1.5

Concrete

Depth

Below Ground Surface (feet)

Grout

18

1.5

Alluvium

26.5

5

6.5

Bentonite Chips

27

Weathered Tonalite

37

RMC Lonestar #3

39

Bentonite Chips

49

RMC Lonestar #3

54

55

Installed: April 6, 2000
## LOG OF DRILL HOLE

**JOB NO.:** S99031  
**PROJECT:** Maderas Golf Course  
**LOCATION:** Poway, CA  
**DRILLING METHOD:** 8-inch Hollow Stem Auger, Auto Hammer

---

**LOGGED BY:** A. Patterson  
**CHECKED BY:** J. Thruber  
**DRILL HOLE NO.:** 1  
**DRILLING DATE:** 4/6/2000  
**ELEVATION:** 465 feet  
**DATUM:** USGS Topo

---

### GEOTECHNICAL DESCRIPTION AND CLASSIFICATION

<table>
<thead>
<tr>
<th>DEPTH (FEET)</th>
<th>SAMPLE</th>
<th>BLOW COUNT</th>
<th>TORVANE SHEAR STRENGTH (PSI)</th>
<th>GRAPHIC LOG</th>
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<tbody>
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</table>

- **"ALLUVIUM (Qai)"**  
- SILTY SAND (SM) brown, dry to damp, trace fine gravel.  
- POORLY GRADED SAND (SP) light orange-brown, wet, very loose, fine to coarse grained sand, trace to minor silt.  
  - Orange, loose, decreasing silt.

- Brown, loose, lenses of silty sand and very coarse grained sand.

- SILTY SAND (SM) gray-brown, moist, medium dense, fine grained sand, trace clay.

- Fine to coarse grained sand, wet.  
- SAND WITH SILT (SP-SM) gray and orange-brown, loose, wet, lenses of fine to very coarse grained sand and fine to medium grained sand.

- Trace fine to medium gravel.  
- POORLY GRADED SAND (SP) light gray, wet, very dense, fine to medium grained sand, lenses of fine to coarse grained sand.  
- Medium to very coarse grained sand.

- **GREEN VALLEY TONALITE**  
- WEATHERED TONALITE (R) gray to orange, moist to damp, completely weathered, quartz, biotite.  
  - 30 feet: Green, highly weathered.

- Highly to completely weathered.

- Light orange-gray, completely weathered.

- Light orange, friable.

- Orange, moist.

---

1) Bottom of drill hole at 55.5 feet.  
2) Groundwater encountered from 2.5 to 28 feet.  
3) MW-1 installed in drill hole on 4/6/00.
# Geotechnical Description and Classification

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Sample</th>
<th>Blow Count</th>
<th>Torvane Shear Strength (PSI)</th>
<th>Pocket Penetrometer Comp Strength (TFN)</th>
<th>Photovac TIP Reading (FPM)</th>
<th>Graph Log</th>
<th>Dry Density (pcf)</th>
<th>Moisture Content (%)</th>
<th>Atterberg Limits</th>
<th>Plastic Limit (%)</th>
<th>Unconfined Shear Strength (PSF)</th>
<th>Additional Tests</th>
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</tbody>
</table>

- **ALLUVIUM (Qal)**
  - SILTY SAND (SM) brown, dry to damp, fine to coarse grained sand.
  - Gray-brown, wet, very loose.
  - POORLY GRADED SAND (SP) gray-brown, wet, very loose, medium to very coarse grained sand.
  - SILTY SAND (SM) brown, wet, very loose, fine to coarse grained sand, trace fine gravel, lenses of red-brown silty sand with clay.
  - POORLY GRADED SAND (SP) light gray-brown, wet, very dense, lenses of silty sand, thin iron oxide cemented layers.
  - SAND WITH SILT (SP-SM) light gray, wet, medium dense, fine to medium grained sand, trace coarse grained sand and fine gravel.
  - Fine to coarse grained sand.
  - Minor iron oxide staining, thin lenses of silty sand.

1) Bottom of drill hole at 27 feet.
2) Groundwater encountered at 2.5 feet.
3) MW-2 installed in drill hole on 4/6/00.
AS-BUILT WELL SCHEMATIC
MADERAS GOLF COURSE
MW-3 and MW-4
(Located 70 feet south of Well 4)

MW-3

Locking Steel Riser
Concrete

Depth Below Ground Surface (feet) 1.5

MW-4

Locking Steel Riser
Concrete

Bentonite Chips

Alluvium

10
11

RMC Lonestar #3

Bentonite Chips

26
26.5

Weathered Tonalite

RMC Lonestar #3

Installed: April 11, 2000

James E. Ghedi
**GEOTECHNICAL DESCRIPTION AND CLASSIFICATION**

<table>
<thead>
<tr>
<th>DEPTH (FEET)</th>
<th>SAMPLE</th>
<th>BLOW COUNT</th>
<th>TORNADO SHEAR STRENGTH (PSF)</th>
<th>POCKET PENETRATOR STRENGTH (TFPM)</th>
<th>PHOTOVAC TIP READING (PFM)</th>
<th>GRAPHIC LOG</th>
<th>DRY DENSITY (PCF)</th>
<th>MOISTURE CONTENT (%)</th>
<th>LIQUID LIMIT (%)</th>
<th>PLASTIC LIMIT (%)</th>
<th>UNCONFINED SHEAR STRENGTH (PSF)</th>
<th>ADDITIONAL TESTS</th>
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</tbody>
</table>

"ALLUVIUM (Qaa1)"  
Silty Sand SM) medium brown with faint orange mottling, loose, moist to wet.

Trace coarse sand, fine gravel.

SAND (SP) medium brown, loose, wet, predominantly coarse angular sand with fines, silty clay lens.

Moist at 16.5 feet.

Silty Sand (SM) lens, reddish-brown, loose to medium dense, damp.

Cobbles?

"GREEN VALLEY TONALITE"  
WEATHERED TONALITE (R) medium gray, very dense, dry to damp, fine grained, friable, with mafics and biotite, highly weathered.

Trace of stiff gray clay.

1) Refusal at 41 feet.
2) Boring completed as MW-3.
<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Sample</th>
<th>Blow Count</th>
<th>Topsoil Shear Strength (PSI)</th>
<th>GRAPHIC LOG</th>
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</tbody>
</table>

**GEOTECHNICAL DESCRIPTION AND CLASSIFICATION**

"ALLUVIUM (Gal)"

Silty Sand SM) medium brown, loose, damp to moist.

Wet at 5 feet, micaceous, open pores.

Sand (SP) medium brown, loose, wet.

With gravel, loose, wet, with scattered fine surrounded gravel.

Becoming Fe stained, very dense, wet, cobbles?

1) Bottom of drill hole at 28.5 feet.
2) Boring completed as MW-4 (alluvial).
APPENDIX “D”
APPENDIX “E”
APPENDIX “F”
APPENDIX “G”
TYPE CURVES FOR A VERTICAL FRACTURE WITH OBSERVATION WELLS ON Y-AXIS
Gringarten-Witherspoon Method

\[ F(uvfr') \]

\[ uvfr' \]

Legend:
- \( r' \) 0.05
- \( r' \) 0.07
- \( r' \) 0.10
- \( r' \) 0.20
- \( r' \) 0.30
- \( r' \) 0.40
- \( r' \) 0.50
- \( r' \) 1.00
- \( r' \) 2.00
- \( r' \) 5.00
- \( r' \) 10.00
TYPE CURVES FOR A VERTICAL FRACTURE WITH OBSERVATION WELLS ON X-AXIS
Gringarten-Witherspoon Method
MADERAS GOLF COURSE PUMPING TEST
Observation Wells 2 and 3
ANALYSIS FOR OBSERVATION WELLS LOCATED WITHIN FRACTURE INTERCEPTED BY PUMPING WELL (X-AXIS)

<table>
<thead>
<tr>
<th>Obs Well I.D.</th>
<th>Pumping Rate during test (gpm)</th>
<th>Pumping Rate during test (cu ft/min)</th>
<th>Observation Well Radial Distance r = x (feet)</th>
<th>r'</th>
<th>Fracture Half-length (xf) (feet)</th>
<th>MATCH POINT</th>
<th>Calculate uvf (=uvf/r' * r')</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 3</td>
<td>144.7</td>
<td>19.3</td>
<td>730</td>
<td>3</td>
<td>243.3</td>
<td>0.3</td>
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<td>Well 3</td>
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<td>486.7</td>
<td>0.23</td>
<td>1.7</td>
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<tr>
<td>Well 3</td>
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<td>19.3</td>
<td>730</td>
<td>3</td>
<td>243.3</td>
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<td>19.3</td>
<td>730</td>
<td>5</td>
<td>146.0</td>
<td>0.5</td>
<td>10</td>
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<td>Well 2</td>
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<tr>
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<td>1160</td>
<td>5</td>
<td>232.0</td>
<td>1</td>
<td>0.1</td>
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</tbody>
</table>

T = Q/4 Pi s * F(ufv, r')
S = Tt/(uvf * xf²)

SOLUTION

<table>
<thead>
<tr>
<th>Well I.D.</th>
<th>T (ft²/min)</th>
<th>T (gpd/ft)</th>
<th>S</th>
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<td>0.452770531</td>
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<tr>
<td>Well 2</td>
<td>0.769709902</td>
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<tr>
<td>Well 2</td>
<td>0.769709902</td>
<td>8291</td>
<td>0.000286</td>
</tr>
</tbody>
</table>
### Analysis for Observation Wells Located Within Fracture Along Y-Axis Passing Through Pumping Well

![Diagram of observation well and pumped well with vertical fracture](image)

<table>
<thead>
<tr>
<th>Obs Well I.D.</th>
<th>Pumping Rate during test (gpm)</th>
<th>Pumping Rate during test (cu ft/min)</th>
<th>Observation Well Radial Distance r = y (feet)</th>
<th>Fracture Half-length (xf) (feet)</th>
<th>MATCH POINT F(uvf,r')</th>
<th>uvf/r'</th>
<th>drawdown s (feet)</th>
<th>time t (min)</th>
<th>Calculate uvf (=uvf/r' * r')</th>
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</thead>
<tbody>
<tr>
<td>Well 3</td>
<td>144.7</td>
<td>19.3</td>
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\[ T = Q/4 \pi s \times F(uvf,r') \]

\[ S = T/(uvf \times x_f^2) \]

### Solution

<table>
<thead>
<tr>
<th>Well I.D.</th>
<th>T (ft²/min)</th>
<th>T (gpd/ft)</th>
<th>S</th>
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<tbody>
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<td>4809</td>
<td>0.000419</td>
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<tr>
<td>Well 3</td>
<td>0.446431743</td>
<td>4809</td>
<td>0.000419</td>
</tr>
<tr>
<td>Well 2</td>
<td>0.769709902</td>
<td>8291</td>
<td>0.000286</td>
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<tr>
<td>Well 2</td>
<td>0.789446053</td>
<td>8503</td>
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</table>
ANALYSIS FOR OBSERVATION WELLS LOCATED WITHIN FRACTURE INTERCEPTED BY PUMPING WELL (X-AXIS)

<table>
<thead>
<tr>
<th>Obs Well I.D.</th>
<th>Pumping Rate during test (gpm)</th>
<th>Pumping Rate during test (cu ft/min)</th>
<th>Observation Well Radial Distance r = x (feet)</th>
<th>Fracture Half-length (xf) (feet)</th>
<th>MATCH POINT</th>
<th>Calculate uvf (=uvfr' * r')</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 3</td>
<td>144.7</td>
<td>19.3</td>
<td>730</td>
<td>5</td>
<td>146.0</td>
<td>0.3</td>
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<tr>
<td>Well 3</td>
<td>144.7</td>
<td>19.3</td>
<td>730</td>
<td>3</td>
<td>243.3</td>
<td>1</td>
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<tr>
<td>Well 2</td>
<td>144.7</td>
<td>19.3</td>
<td>1160</td>
<td>5</td>
<td>232.0</td>
<td>1</td>
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<td>Well 2</td>
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<td>19.3</td>
<td>1160</td>
<td>3</td>
<td>386.7</td>
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</table>

\[ T = \frac{Q}{4 \pi r^2} \]
\[ S = \frac{T}{(uvf * \pi r^2)} \]

**SOLUTION**

<table>
<thead>
<tr>
<th>Well I.D.</th>
<th>T (ft²/min)</th>
<th>T (gpd/ft)</th>
<th>S</th>
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<tbody>
<tr>
<td>Well 3</td>
<td>0.4483747</td>
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<td>0.810220949</td>
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Analysis 2
ANALYSIS FOR OBSERVATION WELLS LOCATED WITHIN FRACTURE ALONG Y-AXIS PASSING THROUGH PUMPING WELL

<table>
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<th>Obs Well I.D.</th>
<th>Pumping Rate during test (gpm)</th>
<th>Pumping Rate during test (cu ft/min)</th>
<th>Observation Well Radial Distance r = y (feet)</th>
<th>Fracture Half-length (xf) (feet)</th>
<th>MATCH POINT F(uvf,r')</th>
<th>uvf/r'</th>
<th>drawdown s (feet)</th>
<th>time t (min)</th>
<th>Calculate uvf (=uvf/r' * r')</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 3</td>
<td>144.7</td>
<td>19.3</td>
<td>730</td>
<td>10</td>
<td>73</td>
<td>1</td>
<td>0.1</td>
<td>3.1</td>
<td>4.3</td>
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<tr>
<td>Well 3</td>
<td>144.7</td>
<td>19.3</td>
<td>730</td>
<td>5</td>
<td>146</td>
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<tr>
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<td>19.3</td>
<td>730</td>
<td>2</td>
<td>365</td>
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<td>3.15</td>
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<tr>
<td>Well 2</td>
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<td>19.3</td>
<td>1160</td>
<td>10</td>
<td>116</td>
<td>1</td>
<td>0.1</td>
<td>1.95</td>
<td>4.6</td>
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<tr>
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<td>19.3</td>
<td>1160</td>
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<tr>
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<td>19.3</td>
<td>1160</td>
<td>2</td>
<td>580</td>
<td>1</td>
<td>0.1</td>
<td>1.95</td>
<td>20.5</td>
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</tbody>
</table>

\[ T = \frac{Q}{4 \pi} s \times F(uvf,r') \]
\[ S = \frac{T}{uvf \times x_f^2} \]

**SOLUTION**

<table>
<thead>
<tr>
<th>Well I.D.</th>
<th>T (ft²/min)</th>
<th>T (gpd/ft)</th>
<th>S</th>
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<tbody>
<tr>
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<td>0.496587033</td>
<td>5349</td>
<td>0.000401</td>
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<tr>
<td>Well 3</td>
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</tbody>
</table>
APPENDIX “H”
Discharge 144.70 U.S. gal/min

Transmissivity [ft²/min]: $6.08 \times 10^{-3}$

Hydraulic conductivity [ft/min]: $6.69 \times 10^{-4}$

Aquifer thickness [ft]: 700.00

Storativity: $2.87 \times 10^{-6}$
Pumping Test No. Constant Rate Test
Wells 2 and 3
Discharge 144.70 U.S. gal/min

Transmissivity (ft²/min): $7.48 \times 10^{1}$
Hydraulic conductivity (ft/min): $1.06 \times 10^{-3}$
Aquifer thickness (ft): 700.00
Storativity: $3.13 \times 10^{-4}$
APPENDIX “I”
Pumping Test No. Constant Rate Test: Test conducted on: 3/28 - 3/31/00
Wells 2 and 3
Discharge 144.70 U.S. gal/min

Transmissivity [ft²/min]: 7.71 x 10⁻¹
Hydraulic conductivity [ft/min]: 1.10 x 10⁻³
Aquifer thickness [ft]: 700.00
Sorptivity: 9.71 x 10⁻⁵
Hydraulic conductivity vertical [ft/min]: 1.10 x 10⁻⁴

Transmissivity [gal/day/ft]: 8300
Discharge 144.70 U.S.gal/min

\[ I(r)^2 \]

Transmissivity [ft²/min]: \( 3.88 \times 10^{-1} \)

Hydraulic conductivity [ft/min]: \( 5.52 \times 10^{-4} \)

Aquifer thickness [ft]: 700.00

Sorptivity: \( 1.37 \times 10^{-4} \)

Hydraulic conductivity vertical [ft/min]: \( 5.52 \times 10^{-5} \)

Transmissivity [gal/day/ft]: 4150
APPENDIX “J”
EXCAVATE WITH HAND AUGER OR 2 MAN BEAVER AUGER TO A MINIMUM DEPTH OF 10 FEET, CENTER WELL PIPE IN HOLE AND DRIVE TO A TOTAL DEPTH OF 15 FEET, BACKFILL WITH NATIVE SOIL TO WITHIN 6 INCHES OF SURFACE.